Highland-lowland linkages and its implications on the livelihood of the communities in Ethiopia: the case of Bale Administrative Zone, Oromia Region, Southeast Ethiopia

by

GETACHEW DEMISSIE DESTA

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SUPERVISOR: DR. MULUNEH WOLDETSADIK

CO-SUPERVISOR: PROF M D NICOLAU

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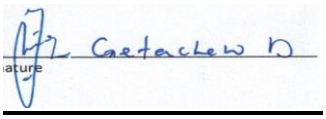
Declaration

I, the undersigned, declare that "Highland-Lowland Linkages and its Implications on the Livelihoods of the Communities in Ethiopia: The Case of Bale Zone, Oromia Region" is my own original work and all materials used or quoted are acknowledged by means of complete references.



Getachew Demissie

Student Number: 55 76 27 35

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Acronyms

AU-IBAR	African Union Interafrican Bureau for Animal Resource
BERSMP	Bale Eco-Region Sustainable Management Program
BoFED	Bureau of Finance and Economic Development
BZARDO	Bale Zone Agriculture and Rural Development Office
BZFEDO	Bale Zone Finance and Economic Development Office
CSA	Central Statistical Agency
DA	Development Agents
DFID	Department For International Development
EDRI	Ethiopian Development Research Institute
FAO	Food and Agriculture Organization
FGD	Focus Group Discussion
GIS	Geographic Information System
HES	Human Environment System
HH	Household
IFPRI	International Food Policy Research Institute
IIED	International Institute for Environment and Development
NGO	Non-Governmental Organization
PFE	Pastoral Forum Ethiopia
RKA	Rural *Kebele* Administration
SHAR	Supporting Horn of African Resillence
TLU	Tropical Livestock Unit
UN	United Nation
UNEP	United Nation Environment Program
UN-IFTPA	United Nation

Abstract

Historically, development in Ethiopia, is a result of intimate highland-lowland interdependencies and complementarities. However, over the course of time, this age-old equilibrium that has harmoniously ruled the economic, social and political life of the highland and lowland communities is getting weaker. This study aimed at investigating the nature and extent of links between the highland and lowland communities of Bale administrative zone and the consequent impacts on their livelihoods. Multi-stage cluster sampling techniques were employed to select 403 sample household heads from the two agro-ecological regions. Questionnaire, interview, FGD and field observations were used as tools of primary data collection. ANOVA, multiple linear regressions ans binary logistic regression were used to analize the quantitative data. Accordingly, the findings of the study indicated that the overwhelming majority (82.2%) of the respondents witnessed the presence of interaction with the adjacent agro-ecological communities. It was identified that highlanders and lowlanders of the zone are interlinked ecologically, economically, socio-culturally and politically. However, due to diminishing of ecological resources, inadequacy of agricultural products and gradual development of resentments between various socio-cultural groups, the status of the linkage is not to the level expected in the study area. In some instances, it steered them to conflict driven by various factors of natural resources, socio-economic and political elements which in turn resulted in humanitarian, social, economic and environmental consequences. Notwithstanding its devastating impacts, both the highland and lowland communities employed the legal and indigenous conflict resolution strategies to curb the problem. Hence, as both the highlanders and lowlanders are vulnerable to some sorts of stresses, seasonality and shocks, strengthening complementarities between them would have invaluable contribution for building resilient livelihoods of both communities, particularly the highly vulnerable lowlanders.

Key words: Bale zone, conflict, copping strategies, ecological, economic, highland, linkage, livelihood, lowland, conflict resolution

CHAPTER ONE
INTRODUCTION

This chapter provides the background to the study, statement of the problem, objectives and an explanation of the scope and significances of the study as well as an indication of the chapter breakdown of the thesis.

1.1 Background of the Study

Highland and lowland regions throughout the world, but particularly in developing economies, are interlinked through complex socio-ecological interactions on various levels (Ives, 2004). Although economic development and societal change often start in the accessible lowlands, remote highland areas provide vital resources for these processes, such as natural resources, agricultural products, and labor surplus in most of Asian and Latin American countries (Mahdi et al., 2009).

Unlike Asian and Latin American countries, in most regions of Africa, the highlands are more densely populated, accessible and serve as economic growth poles (Mcintire et al., 1992; Soini, 2006; Jodha, 2002); while the lowlands are marginal with limited livelihood options that are vulnerable to environmental shocks (Devereux, 2006). In these regions, many highland communities are ethnically or culturally distinct from lowland populations, and local highland communities are often highly divergent from each other (Korner and Ohsawa, 2003).

Human settlements in the highlands and lowlands of Ethiopia have occurred since the Paleolithic age. Inhabitants of these agro-ecologies have historically been interacting with each other for survival. The types of recognized interactions include a broad variety of services, such as exchange of food items and fodder, transport services, healthcare, and recreation facilities (Hug and Baccini, 2002). All these interactions have served to complement historical ecological resource deficits. An ecological region may have the capacity to export some goods, whereas resource may not be adequate to satisfy the regional demand for other goods. Thus, mutual relationships exist between highland and lowland ecologies (Judha, 2002). However, it is important to have a clear notion of these spatial units, the highlands and lowlands before any discussion.

In the context of Ethiopia, the highland comprises of a high central plateau, which occur above 1500 meter above sea level (United Nations Economic and Social Affairs, 2000; Hurni, 1998). Similarly, Workneh (2011) used the 1500-meter mark above sea level as a demarcation line between highlands and lowlands in Ethiopia. On the contrary, Mesfin (1988) argued that any categorization of highlands and lowlands with altitude as the only criterion ignores the practical implication of using such a classification for planning purposes. Ishikawa (2008) also shares the view of Mesfin (1988). Ishikawa (2008) then listed additional characteristics that can be attributed to the differentiation between the highlands and lowlands in Southeast Asia. These criteria include political status, economic development, demography, urbanization, agricultural mode, social mobility, the civilization's worldview, and religion and kinship system. Accordingly, highland is often recognized for political marginality, underdevelopment, minority, rural, environment dependent, mobile, little tradition, animism and lineality-based (decent group), while the lowlands are often known for political center, development, majority, urban, irrigation based, sedentary, great tradition, world religion and lateraliy-based (kindred) (Ishikawa, 2008). However, in Ethiopia, the reverse holds true. The highlands are political centers and sedentary, while the lowlands are relatively, periphery (Dinku, 2018) and mobile.

On the other hand, agro-ecological zones are important spatial units used to organize geographic space to understand its productivity (Chamberlin and Schmidt, 2011). This type of categorization employs biophysical attributes of soil, topography (elevation above sea level), and climate (rainfall, temperature and humidity) to organize production systems into relatively homogenous units (FAO, 1978; Hurni, 1998). Consequently, Hurni (1998) implemented a set of agro-ecological zone definitions for Ethiopia, based on traditional zone designations widely used by rural communities. These traditional agro-ecological zones are divided into five agro-ecological zones. These are *wurch* (cold highland), *dega* (cool highland), *woinadega* (midland), *kola* (semi-arid lowland) and *bereha* (desert) (Hurni, 1998). In this study *wurch*, *dega* and *woinadega* are categorized into highland (elevation greater than 1500 meter), while *kola* and *bereha* are classified into lowland (elevation less than 1500 meter).

In this regard, though reported proportion varied, in Ethiopia about 43% of the landmass is categorized as highlands (altitude higher than 1500 meter above sea level), while the remaining 57% are lowlands (altitude lower than 1500 meter above sea level) (World Bank, 2004). The

highland is inhabited by 85% of the population, covers 95% of the cultivated land and supports about 80% of the country's livestock population (Workneh, 2011). Due to more favorable climate with optimal rainfall, Ethiopian agriculture is developed mainly in the highlands, with a system of rain-fed mixed farming (World Bank, 2004). On the other hand, the lowlands are climatically arid, semi-arid and sub-humid (Workneh, 2011; Yanda, 2003).

Moreover, based on spatial characteristics, resource endowments and prevalence of development obstacles, Ethiopian regions are divided into four socio-economic or development regions. These include low potential-high risk, medium potential-low risk, medium potential-high risk, and high potential-high risk regions (World Bank, 2004).

As rural livelihood activities in Ethiopia are agro-ecology sensitive (Dereje and Abeje, 2018), these characteristics of the spatial units have their own effect on the mainstay of the community inhabiting these localities. Variation in altitude and physical feature of the zone has resulted in a diversified micro-climatic conditions, soils and vegetation covers. As a result, the highlanders and lowlanders are engaged in different economic activities as a means of livelihoods. In this regard, Ethiopian highlands have been the most favored areas of the country for both settlement and farming. Temperature and rainfall conditions are favorable to settled agricultural life. The hot and relatively dry lowlands, by contrast, are the realm of nomadic pastoralists (Mesfin, 1988; Adugna and Aster, 2007). Hence, in the country subsistence mixed smallholders' agriculture in the highlands and pastoral system in the semi-arid lowlands are the main means of livelihood for the communities (Workneh, 2011).

In Bale zone, the highland (agro-pastoral) *woredas*[1] are known for their production of cereals, pulses, and oil seeds, while the lowland pastoral and agro-pastoral households have relied on livestock rearing, honey and coffee production as well as fruit cultivation. However, both the highlanders and lowlanders are not self-sufficient in perusing their livelihoods. Vulnerability to food insecurity is a common phenomenon along the semi-arid lowlands and degraded highlands where rural households rely on rain-fed agriculture (Teshome, 2013; Chamberlin and Schmidt, 2011).

[1] *Woreda* is the second lowest administrative tier which may correspond to a district.

Thus, both highland and lowland farmers are looking for alternative opportunities to reduce their vulnerability (Soini, 2006). In designing such strategies that can reduce the vulnerability of the highlanders and lowlanders, first it is important to understand their asset basis and active necessities. Importantly, because of their biophysical features, highlands and lowland are endowed differently regarding resource and production opportunities. Hence, one option to make their livelihoods to be resilient against such shocks, stresses and seasonality is strengthening linkage between them. This is mainly because; linkages between the two ecological regions, in terms of access to natural resource, trade and mobility have important implications for sustainable development of the two ecological regions (Eriksen et al., 2011), as highland-lowland linkage is a multifaceted phenomenon involving ecological, economic, social, cultural and political interactions (UN economic and Social Affairs, 2000). Besides, the mutual dependency and cooperation plays a crucial role in maintaining peaceful relations (Owuor, Mauta & Eriksen, 2011). However, existence of irreconcilable ends and competition over the use resources make concflict an inevitable phenomenon (UN-IFTPA, 2010).

1.2 Research Problem

The significance of linkage between highlands and the adjacent lowlands is understandable. Early civilizations developed as a result of the highland-lowland interdependencies and complementarities (Stoffel et al., 2002). However, this age-old equilibrium that has harmoniously ruled the economic, social and political life of the highland and lowland communities is getting weaker at present. This arises from poor ecological, economical, socio-cultural and political linkages between highland and lowland communities. Moreover, this poor linkage is attributed to infrastructural problems, socio-cultural factors, in accessibility and lack of market areas as well as subsistence-oriented production (Jodha, 2002).

Despite variations between highland and lowland system in terms of ecology, resource endowments, economic condition, infrastructure development the communities in both highland and lowland agro-ecologies are commonly affected by poverty, poor economic growth and low productivity (Workneh, 2011). This can be attributed to land degradation resulting from intensive and continuous farming on the highlands and low productivity of livestock resulted from overgrazing in the lowland areas (Yanda, 2003). The inhabitants of lowland are particularly prone to drought related consequences just as food insecurity and conflict over resource use, and

the diminishing tradition of tolerance towards the sharing of resources (Dinku, 2018; SOS Sahel, 2008). Besides, the highland agro-pastoral communities, which were known for their crop production, are pushing their boundaries towards the grazing land of the lowlanders, as their land is getting unproductive due to over cultivation. Likewise, the lowland pastoral communities are moving towards the boundary of the highlanders as the productivity of their livestock decline due to overgrazing and lack of water (Yannda, 2003). This in turn, drives inhabitants into conflict over resources. In most cases, conflict arises over issues such access too and control over resources, and the influence of decisions regarding their access, allocation, the sharing of benefits, the management and rate of natural resource usage (Majekodunmi et al., 2014). Therefore, conflict is inevitable due to aspects of scarcity and mobility between the sedentary peasants in the highlands and mobile pastoralists in the lowlands (Markakis, 1994). This clash over resources can surge to violent conflict when it overlaps with other factors, such as ethnic polarization, high levels of inequity, poverty, injustice and poor governance (UNEP, 2012). Therefore, understanding how to transform conflicts over resources into mutually beneficial outcomes that deepen trust and inter-dependence between highlanders and lowlanders is a key aim of effective conflict resolving strategies.

Thus, for the highlanders and lowlanders to maintain their livelihoods sustainably, they need to be inter-linked ecologically, economically, socio-culturally and politically with each other. It is also envisaged that interaction between highland and lowland economic systems would contribute to prevention, mitigation and resolution of conflicts that may arise among different socio-cultural groups, particularly between lowland pastoralist and highland agro- pastoralist (Workneh, 2011). This lay foundation for complementary linkages between the highland and lowland communities.

Likewise, for Bale administrative zone, which has vast areas of lowland, to maintain balanced and sustainable development, interlinking the two ecological settings would be valuable. In doing so, detailed study ought to be done by scholars. However, limited studies were undertaken in Ethiopia in general and the specific study area. One such study carried out by Workneh (2011) was in the Northeastern Ethiopia, emphasized the economic linkage of the pastoral lowland and highland system. The other dimensions such as ecological, socio-cultural and political of the highland-lowland linkages remained uncovered. Thus, to comprehend the full extent of highland-

lowland linkages in Ethiopia in general and Bale administrative zone in particular, conducting a study would be worth nothing.

The main reason for selecting this study area is, therefore, attributed to different justifications. In the area (zone), the highland and lowland ecologies seem loosely integrated. However, the largest proportion (69%) of the zone is found in the lowland ecology, which is a fragile environment, vulnerable to drought related shocks and conflict over the use of natural resources. Hence, most of the lowland pastoral communities of the zone remained food insecure (FAO, 2017). This problem can be solved by integrating them with the relatively better highland ecology in terms of resource, product and service sharing. The report of the World Bank (2004) also indicated that the zone is categorized under high potential and high-risk regions. So, mechanisms ought to be designed to reduce risks and maximize the potentials. These and other casually observed development problems of the zone need to be studied. Thus, the purpose of this study is to investigate the interaction of highlanders and lowlanders and to establish the equilibrium of their linkage whether it is unidirectional or bi-directional. Moreover, the study aimed at filling the present literature gap in the academic arena regarding the issue under study.

1.3 Research Questions

The following research questions need to be answered at the end of the investigation.

1. What are the types, nature and extent of highland-lowland linkages?
2. How an ecological, economic, socio-culture and political factors do encouraged or discouraged highland-lowland linkages?
3. What are the nature and magnitude of highland and lowland conflict?
4. Why conflict arises between highland and lowland communities and how it is resolved?
5. What are the implications of the highland-lowland linkages on the livelihoods of the highlanders and lowlanders?
6. How highland-lowland linkage influence livelihoods of the communities?
7. How do the highlanders and lowlanders cope up during ecological and economic stress seasons?

   Basic Assumptions/ Hypothesis

Household characteristics like: household size, age of the household head, sex of the household head, educational level of household head, number of able labor force in the household, settlement ecology, status in the agro-ecology, main economic activities, linkage of HH to the adjoining agro-ecological communities; and farm characteristics such as total agricultural landholding area per capita for each household heads, livestock number in TLU, total crop product in Kg/HH have significantly and positively affect the livelihood outcome of households measured in annual income obtained from various sources.

Moreover, the presence or absence of socio-cultural factors (existence of relatives or friends, participation in social affairs, looking educational and health services), economic factors (exchange of farm products, livestock, fire woods or charcoal, honey or coffee and labor) and ecological factors (availability of pasture, water, arable land and forest) have determining the level of highland-lowland linkages in the study area.

Furthermore, variation in livelihood outcome among the four rural *kebele* administrations and the two agro-ecological regions (highland and lowland) was tested with the help of one way ANOVA and independent t-test, respectively.

1.4 Objective of the Study

1.4.1 General Objective

The main objective of this study is to assess the nature and extent of ecological, economic, socio-cultural and political links between highland and lowland communities of Bale administrative zone and consequent impacts on the livelihood of the communities.

1.4.2 Specific objectives

The specific objectives of this study are:

1. To examine the type, nature and extent of highland-lowland linkages
2. To identify the ecological, economical, socio-cultural and political factors influencing the highland-lowland linkages
3. To explore nature, extent and causes of conflicts that prevailed among the two communities, and the conflict resolving strategies among highlanders and lowlanders

4. To appraise the role of the linkages in improving livelihoods of the communities
5. To compare the livelihood coping strategies of highlanders during the time of ecological and economic stress

1.5 Significance of the Study

The basis of highland-lowland linkage is provided by the differences in their natural resource endowment and production potential as well as exchange opportunities they generate. Equally important are the man-made arrangements, ranging from infrastructure and institution to technological and human capabilities, which shape the nature, magnitude and pattern of the linkage. Strong highland-lowland linkages can assist in spreading opportunities for livelihood and well-being distributed more evenly over space; create more resilient regional economies and thereby promote stable national economies; create a high level of spatial scanning to mitigate unintended impacts on environment and longer-term sustainability of development in both highland and lowland areas.

Therefore, in this study an attempt was made to highlight the extent to which the highlanders and lowlanders depend on each other for their livelihoods. In this regard, the result of this study may inform development policy makers in designing strategy that promotes equitable development and economic complementarities between highlands and lowland agro-ecology. In this regard, policy makers may get an insight on the necessity of designing separate development policies and strategies for the highlanders and lowlanders that suits with their agro-ecological contexts. In addition, this research might give an insight that enable to design a strategy that minimizes land use conflicts between highlanders and lowlanders, so that highlands and lowlands would develop jointly. Moreover, the outcome of the study might encourage cooperation between communities of the two agro-ecologies through sharing of their ecological and economic resources and then increase their socio-economic inter-linkage further. In this regard, planners and policy makers might enable to make informed decision on where to place communication infrastructures, irrigation infrastructures and social services so that they can harness the complementarity between highlanders and lowlanders. Therefore, the primary beneficiaries of this study are communities in the two agro-ecological regions and policy makers on different levels.

Furthermore, as geographic research works in the field are scarce, findings of this study may have also an academic significance in contributing idea to the existing body of knowledge and

generate baseline data regarding highland-lowland linkage. The study might introduce new approach of addressing rural livelihoods issues by increasing ecological, economic, socio-cultural and political linkages between the two parties.

1.6 Scope of the Study

The study focused on investigating the nature and extent of the linkages between highland and lowland communities of Bale administrative zone and consequent impacts on the livelihood of the communities. Geographically, although the administrative zone has eighteen administrative *woredas*, due to manageability concerns, this study was restricted to four administrative *woredas*, situated at highland and lowland agro-ecological regions. From these administrative *woredas* four rural administrative *kebeles* (Rira, Chirri, Buria and Mandera) that represent the two agro-ecologies were selected as sample study sites.

Thematically, the study was delimited to the four dimensions of highland-lowland linkages. These include ecological, economic, socio-cultural and political linkages. The ecological linkage was delimited to interaction made in the use of some communal resources like grazing land, water and forest. The economic linkage was restricted to the exchange of agricultural products of the highlanders and lowlanders. The socio-cultural linkages were bounded to the interactions made through the formal and informal institution. Moreover, the political linkage was restricted to the interactions made through the administrative structures of the *woredas*.

Methodologically, the study was delimited to 403 sampled rural household heads from the two agro-ecologies. Thus, the unit of analysis in the study was the household head level. Then generalization was made at community or agro-ecology level.

1.7 Limitations of the Study

One of the limitations of this study is drawing a sample highland and lowland *woredas* that are adjacent to each other. This is done to minimize the interference from other agro-ecological regions. However, it is difficult to get a clear-cut boundary between the truly highland and truly lowland agro-ecological regions. Hence, elevation above sea level was used as objective criteria to differenciate these agro-ecologies. Thus, further studies ought to give more attention in selecting such truly highland and truly lowland *woredas*, though they are not adjacent to each other employing other approach. Moreover, the incidence of conflict between the lowlanders of

the administrative zone in Oromia regional state and Somali regional state coincided with the schedule of data collection. It resulted in an extension of data collection period that in turn influenced the time to finalize the research. Furthermore, as can be expected in any survey, some respondents were reluctant to share the exact size of their farm plots for several reasons. Nevertheless, the researcher attempted to crosscheck amount of production surveyed with possible farm size. It should, however, be noted that the specified challenges did not adversely affect the quality of data collected.

1.8 Thesis Organization

The research report consists of ten chapters, which includes:

Chapter 1: Briefly introduces the study, including the background of the study, problem of the study, the aim and objectives of the study, significance of the study, scope and limitations of the study.

Chapter 2: Presents the conceptual, theoretical and empirical literatures. It focuses on the types, nature and magnitude of highland-lowland linkages. Moreover, dimensions and factors influencing highland-lowland linkages and its implication on the livelihoods of communities were presented. It further presents issues of conflict and its resolution strategies.

Chapter 3: Presents description of the physical and socio-economic characteristics of the study area in detail. It emphasized on giving context to the study area (Bale zone) and study sites (the selected highland and lowland *woredas*).

Chapter 4: Presents the research methodology. It covers the research design and approach employed in the study. Thus, issues of sampling, data collection and analysis were discussed.

Chapter 5: Presents the demographic and socio-economic characteristics of the study population. It gives background information about their age, sex, marital, educational and occupational status of the respondents considered from both the highland and lowland *woredas*.

Chapter 6: Presents the findings of the study on the type, nature and extent of highland-lowland linkages. It gives an insight into the ecological, economic and socio-cultural linkages of the highlanders and lowlanders.

Chapter 7: Presents factors influencing the linkages between the highlanders and lowlanders. It further highlights factors related to limited accessibility to road and market, resource and product insufficiency and institutional and socio-cultural restraints.

Chapter 8: Presents about conflict between highlander and lowlanders. It was organized into the following sub-sections: nature, extent and causes of conflicts that prevailed between the two communities; impacts of the conflict and their resolving strategies.

Chapter 9: Presents about the implication of highland-lowland linkages on the livelihoods of rural communities. Comparative analysis of the livelihood strategies of the highlanders and lowlanders, their vulnerability to shocks and stress as well as coping strategies adopted during the time of ecological and economic stress; and the role of the linkage in improving the livelihoods of both communities in Bale administration zone.

Chapter 10: Presents summary and conclusions drawn from the findings and discussions made. It further presents some recommendations for further study and policy implications.

CHAPTER TWO

LITERATURE REVIEW

In this chapter, an attempt was made to review the conceptual, theoretical and empirical literatures concerning ecological, economic, socio-cultural and political relationships between the highlands and adjacent lowlands. In addition, the consequential impacts of these linkage on the livelihoods of communities inhabited the two ecological regions has been examined. Furthermore, factors that drive communities in the two agro-ecological regions into conflictual relations and strategies of resolution were reviewed thoroughly.

2.1 Concepts, Types, Nature and Extent of Highland-lowland Linkages

2.1.1 Concepts of highland and lowland linkage

For most scholars' highlands are synonymous with mountains (Mesfin, 1988; UN Economic and Social Affairs, 2000; Ives, 2001; Hug and Baccini, 2002; Stoffel et al., 2002). On the other hand, highland includes mountains and hills, while lowland includes plains (Jodha, 2002; Ishikawa, 2008). Moreover, highland is equivalent to upland and upstream, while lowland is corresponding with downstream (Painter, 1991; Korner and Ohsawa, 2003).

In Ethiopia, the highlands are political centers and sedentary, while lowlands are relatively periphery and mobile. In this regard, Mesfin (1988); Adugna and Aster, (2007) argued that for centuries, the Ethiopian highlands have been the most favored areas of the country for both settlement and farming. Temperature and rainfall conditions are favorable to settled agricultural life. The hot and relatively dry lowlands, by contrast, are the realm of nomadic pastoralists.

On the other hand, agro-ecological zones are important approach used to organize geographic space to understand its productivity (Chamberlin and Schmidt, 2011). This type of categorization employs biophysical attributes of soil, topography (elevation above sea level), and climate (rainfall, temperature and humidity) to organize production systems into relatively homogenous units (FAO, 1978; Hurni, 1998). Consequently, Hurni (1998) implemented a set of agro-ecological zone definitions for Ethiopia, based on traditional zone designations widely used by rural communities. These traditional agro-ecological zones broadly include *kola*, *woinadega* and *dega* in Amharic, with their English equivalence of lowland, midland and highland, respectively.

This classification also coincides with the cut-point (1500 meter above sea level) of highland and lowland ecological zones.

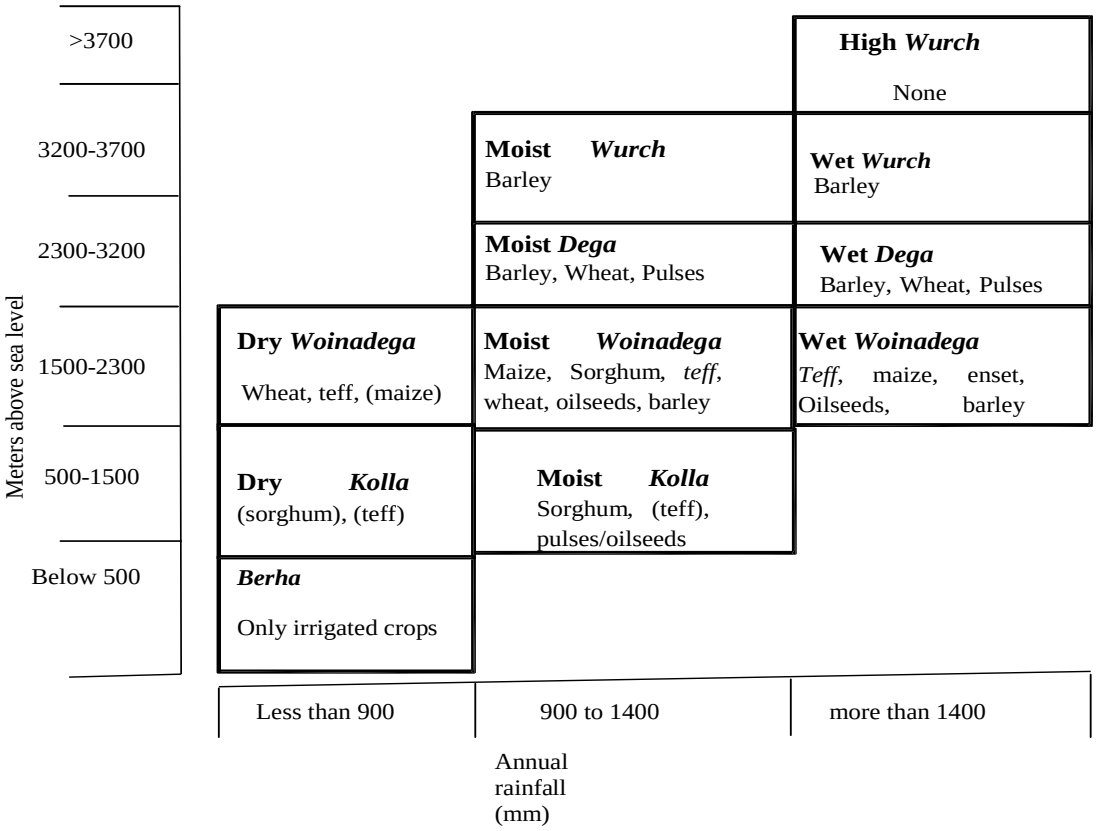

Figure 2.1: Traditional Agro-Ecological Zones and Selected Crops across Altitudinal Ranges (Adapted from Hurni, 1977)

These spatial units have their own effect on the livelihood of the community inhabiting these localities. For instance, subsistence mixed smallholder's agriculture in the highlands and pastoral system in the semi-arid lowlands are the main means of livelihood for the communities (Workneh, 2011). However, both the highlanders and lowlanders are not self-sufficient in perusing their livelihoods. Vulnerability to food insecurity is a common phenomenon along the semi-arid lowlands and degraded highlands of Ethiopia where rural households rely on rain-fed agriculture (Teshome, 2013; Chamberlin and Schmidt, 2011). Thus, both highland and lowland farmers are looking for alternative opportunities and are willing to engage in off-farm and non-farm activities depending on their livelihood assets (Soini, 2006). In designing strategies that reduce the vulnerability of the highlanders and lowlanders, first it is important to understand their biophysical features and their active necessities. Importantly, because of their biophysical

features, highlands and lowland are endowed differently regarding resource and production opportunities.

Hence, linkages between the two ecological regions, in terms of access to natural resource, trade and mobility have important implications for sustainable development of the two ecological regions (Eriksen et al., 2011). Besides, the highland-lowland interaction has become critical for survival and to cope with stress seasons for both highland and lowland communities. Furthermore, the mutual dependency and cooperation that it represents plays a crucial role in maintaining peaceful relations (Owuor, Mauta and Eriksen, 2011).

2.1.2 Types of highland –lowland linkages

The types of highland-lowland linkages are rooted in the difference between them in terms of basic resource endowments, ways and capacities to harness them and the patterns of exchanging them with each other (Jodha, 2002). Thus, highland-lowland linkage is a multifaceted phenomenon involving ecological, economic, social, cultural and political interactions (UN economic and Social Affairs, 2000). Similarly, Tolossa and Baudouin (2004) identified ecological, economic and social dimensions of highland-lowland linkages. Stoffel et al. (2002) and Yanda (2003) also used the socio-economic and biophysical linkages to explain highland-lowland relations. It is mainly because, their objective was to study land use dynamics of the two ecological regions. Jodha (2002) and Workneh (2011) looked at the economic dimension to study highland-lowland linkages. Here again, their objective was to study the implication of the economic linkage on poverty and livelihoods of the lowland communities. Moreover, Korner and Ohsawa (2003) studied highland-lowland linkage from two perspective, physical processes and exchange of resources. Ishikawa, (2008) on his side identified three dominant ways in which the highland-lowlands communities interact. These are ecological, economic and cultural linkages.

As can be concluded from the reviewed literatures above, most of the studies made so far failed to treat all dimensions of highland-lowland linkages equally, since the objective and perspectives of the studies vary. Scholars from the economics discipline emphasized the economic dimensions of theses linkage, while others from environmental studies give more regard for the ecological linkages. In most of the studies consulted for this thesis, the social, cultural and political dimensions were often disregarded. However, from the viewpoint of geographic study,

it would be important to obtain a holistic perspective on the highland-lowland linkages and their impact on the livelihood of the communities, and thus it would be valuable to consider these dimensions as well.

Therefore, highland-lowland linkage is a concept, that covers a broad range of processes and effects (Jodha, 2002), but in this sub-section, an attempt was made to analyze the ecological, economic, socio-cultural and political dimensions of the linkages.

2.1.2.1 Ecological Linkage

Highlands and lowlands may have diversity of natural resources that present sources of multiple production options. Moreover, highlands or lowlands may have niche resources, which are exceptional for them to have economic advantages (Jodha, 2002). Because of the very nature of landscapes, the flow of natural resource such as water and nutrients from highlands to downstream lowlands has been as eternal as the mountains (Soini, 2006). On the other hand, there are semi-managed natural resource flows from the highlands. These include invisible environmental gains in terms of groundwater discharge, nutrients (Soini, 2006), biodiversity elements, silt-free water flows, physical stability of downstream watersheds, and so on which are directly related to conservation and protection of highland watershed by highland community (Stoffel et al., 2002; Jodha, 2002). This type of linkage appears to be unidirectional, as most of uncontrolled and semi-controlled resources flow from the upstream to the downstream regions.

The other aspect of this ecological linkage can be viewed from mutual benefit that the two communities obtained from pastureland use, which exist between the two production systems. In post-harvest season, the highland ecology offers adequate amounts of crop residues as fodder (Soini, 2006). As a result, sedentary farmers in the highland welcome their herding lowland neighbors for grazing in their farm plots. Here the interest of sedentary farmers is not only motivated by the desire to accommodate lowlanders as a token of good will and friendliness but rather, more importantly because they are aware of the gains of useful amount of manure from the dung of the grazing animals (Stoffel et al., 2002; Atkilt, 2003; Woodfine, 2009 in AU-IBAR, 2012; Soini, 2006). In addition to this, the highlanders also improve the advantage of establishing individual friends among the lowlanders for future beneficial relationship at individual and family level. The major one among these is the advantage of accessing water

sources for their animals including lowlanders-built ponds and streams (Atkilt, 2003). Thus, the main ecological interdependencies observed between highlands and lowlands include water resource use, land resources, wood fuel and other resources. Particularly, inter-dependency on water resources is common for both ecological regions at different seasons of the year (Yanda, 2003; Soini, 2006). The other ecological resource that plays crucial role in creating platform between the highlanders and lowlanders is pasture ground. However, its role in linking the highlanders and lowlanders is getting weaker due to population pressure in general and livestock population in particular. This happened mainly due to tragedy of the commons as explained by Hardin (1968). Hardin used pasture ground to explain his concepts of tragedy of the commons in such a way: "it is to be expected that each herdsman will try keeping as many cattle as possible on the commons (Hardin, 1968:1244)".

2.1.2.2 Economic Linkage

Another important type of linkage is an economic exchange linkage (Atkilt, 2003). Primarily because of their biophysical structures, highlands and lowlands are gifted differently regarding resource and production opportunities. This forms the basis for complementary economic link between them (Soini, 2006). This can be manifested through exchange of resource, product and service. And the exchange system can be mediated by market forces, state interventions or the interaction level evolved by communities (Jodha, 2002; Jodha, 1998). Traded commodities and service flows such as herbs, flowers, seeds, fruits, vegetable, forest products and tourism in which the highlands have a natural competitive advantage are products and services that link them with the lowlanders. As parts of informal trading these items are becoming major commodities of trade between the highlanders and lowlanders at the early stage of the linkage (Jodha, 1998).

On the other hand, the sale of livestock and livestock products is the main source of cash income for the lowlanders. Livestock and their products are marketed in the nearby towns and market of highlanders. Alternatively, the lowlanders satisfy their demand from diverse crop products bought from their highland neighbors. Therefore, market exchange was one essential form of their interdependence (Atkilt, 2003).

Furthermore, the periodic migration of adults from highlands to lowlands is well known form of human resource flow (Jodha, 2002). Migration from highlands to lowlands, for whatever reason, is an indicator of the other type of economic linkage between the two ecological regions. The linkage resulting from migration has two aspects, and these are related to the outflow of manpower and the inflow of remittances (Banskota and Sharma, 1999). Depending on how one perceives it, its impacts for the highlands are mixed. Besides, creating labor scarcity and increasing women's work burden in the highlands, migration also generates a more regular flow of income for families in highland (Jodha, 2002). Although most literatures (Jodha, 2002; Banshkota and Sharma, 1999; Yanda, 2003) highlighted labor flow from highland to lowland, there are also circumstances whereby the lowlanders move to the highlands to look for better services like health and education.

2.1.2.3 Socio-cultural Linkage

For a variety of reasons, the highlands are some of the most culturally diverse regions on the planet earth (Ives, 2001). The preservation of traditions, languages and dialects, ethnic dress, architecture, methods of land management and farming techniques, have opted to illustrate many highland areas as practical cultural museums (Ives, 2001; Majekodunmi et al., 2014). Thus, the ethnic and tribal organizations and the bonds of partnership that bring the highland communities together with their neighbors in the lowlands are very crucial in promoting socio-cultural linkage (Stoffel et al., 2002). The dry grazing season is an important occasion of cultural exchange including learning each other's languages (which is a very crucial instrument of securing better advantages in the markets where the two communities interact), exchange of lifestyles (food, clothing best ways of animal adaptation and use etc.) as well as useful customs and traditions (Atkilt, 2003). Moreover, households used informal credit networks like borrowing of coffee or cash during difficulties through their kinship ties (Manlosa et al., 2019).

Thus, migration and market provide significant means of socio-cultural linkages between the highlands and lowlands. Human mobility becomes the predecessors of commodity transfers, of both commercial and cultural items (Ives, 2001). This socio-cultural linkage further contributes to ecological and economic linkages. Hence, literatures show (Ives, 2001; Stoffel et al., 2002; Atkilt, 2003) that socio-cultural linkages are two directional.

2.1.2.4 Political Linkage

Another form of highland-lowland linkage is manifested through political or governance structure. Institutional support provides for commercialization and specialization of highland or lowland resource products based on their natural comparative advantages increases the magnitude of flows of resources and hence facilitates links between the highlands and lowlands. Particularly, fair social transfer and public sector investment flow play role in this regard. Jodha (2002) stated that development projects in either of the two ecological regions need to be free of bias in terms of design and mechanisms of implementation. This is mainly because; it reduces the relevance and effectiveness of investment flow between the highlands and lowlands.

Moreover, governmental structure and quality facilitated interaction between highlanders and lowlanders through channeling the state power in the form of flow of information, grants and development funds, human resource, machinery and equipment as well as policies and legislations (Ishikawa, 2008; Banskota and Sharma, 1999). All these interactions are determined by the structure and quality of government, be it is centralized or decentralized. Furthermore, institutional service delivery linkages as a precondition for other links are believed to be most available in those areas where there are governmental and NGOs supporting production activities through the community-based organizations. At the same time, at the local level, it is being realized that helping the local people organize themselves help them create an effective demand for service deliveries and other production inputs (Banskota and Sharma, 1999). Besides, the quality of governance determines the nature and magnitude of the interaction. It would then stand to reason that poor governance discourages highland-lowland linkages and this may result in negative reactions between them (Ives, 2001). On the other hand, good governance facilitates highland-lowland linkages and may result in positive reaction between them.

2.1.3 Nature and extent of highland-lowland linkage

Scholars who made their research in this field of study presented different arguments regarding the dynamics of the interdependency between the highlanders and lowlanders. For example, Kiteme et al. (1998) and Yanda (2003) agreed that the equilibrium of the interdependency is skewed to the side of the highlanders. These authors specified that the highlands are source areas while the lowlands are recipient of natural resources. Therefore, their interaction is helpful to transfer natural resources from highlands to the surrounding low potential lowland areas. Thus,

the interaction is unidirectional. Conversely, Jodha (2002), revealed the differential in resource and production endowment between the highland and lowland form a basis for complementary economic links between them. Thus, their linkage is manifested through exchange of resource, products, and services in both directions. According to Jodha (2002), the lowlands are not only receivers of resources, products, and services but also suppliers of some resources, products and services. However, the position of highlands as a trade partner of lowlands is weak (Jodha, 2002; Hug and Baccini, 2002). It should however, be noted that, ecological gradient and natural resource endowment are unique to some areas, as there are areas where the lowlands have higher potential for crop production and other uses such as livestock rearing than highlands (Yanda, 2003).

Another argument is raised by Workneh (2011) is that although there is difference in natural resources endowment and economic conditions, both the highland and lowland communities are affected by poverty, low economic growth and productivity. According to Yanda (2003), this is attributed to land degradation resulted from intensive farming in the highlands and low productivity of livestock resulted from overgrazing in the lowland areas. Thus, enhancing market and economic linkages between the two ecological regions would benefit both parties (Workneh, 2011). Korner and Ohsawa (2003) support this argument in that, enhancing highland-lowland interdependencies and complimentarily are crucial for both upstream and downstream communities. Normal highland communities require linkage to lowland markets and vice versa (Korner and Ohsawa, 2003).

2.2 Factors Influencing Highland-Lowland Linkages

The type, nature and extent of linkages between highlands and lowlands are rooted in the difference of basic resource endowment, means to utilize them and patterns of exchanging them with each other (Jodha, 2002). Thus, the strength of highland-lowland linkage can be determined by market forces, government interventions and social interaction involved among the communities. Moreover, ethnic and tribal arrangements are found to be important ties for partnership and trade relationship among these communities (Stoffel et al., 2002). More explicitly, factors influencing highland-lowland interaction include accessibility, fragility of the environment, marginality, diversity in terms of biological, cultural and climatic aspects (Korner and Ohsawa, 2003).

Obviously, isolation, semi-closed situation created by remoteness and permanent under investment in these ecological regions may add the cost of logistics and other support systems to enhance production opportunities and their competitiveness and equitable trade (Jodha, 2002). Investments in connective infrastructure are facilitating the movement of ideas, technologies, goods and services, and labor to areas that demand specific products and distribute other outputs. Thus, improving and restoring primary road infrastructure supports secondary and primary market interactions. Maintaining and constructing rural roads that connect agricultural surplus areas with small towns and urban centers also encourage comprehensive geographic supply and demand networks. A continuum of population density generates a portfolio of interrelated places and these places, when functioning properly, will bring about greater economic interaction and ultimately leads to development within all spatial spheres (Chamberlin and Schmidt, 2011).

In addition, some edaphic factors not only prevent intensification of land resources use for high productivity but also impede infrastructural development to improve accessibility to facilitate mobility and trade of lower costs (Jodha, 2002). On the other hand, marginality of production may also be caused by physical, socio-economic or geo-political factors. And this may result in weak linkages between the highlands and lowlands. This in turn leads to poverty, vulnerability and limited economic option.

Furthermore, having diversities of resource base as a source of spatially and temporally different production opportunities may contribute for linkage if properly harnessed and traded. Particularly, having niche resources like timber and non-timber forest products, minerals and eco-tourism with a comparative advantage in ecological regions may either facilitate or obstruct linkages (Jodha, 2002). Moreover, economic and political changes, social insecurity, technology, market, marketing power, as well as policy failures and globalization are likely to alter the complex highland-lowland linkages and further exacerbate marginalization of either of the two ecological regions (Banskota and Sharma, 1999).

Generally, factors that facilitate or obstruct highland-lowland linkage can be categorized into Ethnic and tribal structure, differential in resource endowment, governance and availability of infrastructure, service, market as well as prevalence of conflict.

2.3 Concepts, Causes, Consequences and Resolving Strategies of Conflict

The term 'conflict' is used as an umbrella term to cover a range of phenomena like lack of convergence of goals, interests, and expectations among social groups; livelihood strategies that result in damage to others and open confrontations resulting from conflicting interest (Hagberg, 1998; Hussein, 1998). It is understood as contradictions that occur due to the existence of incompatible goals (UN-IFTPA, 2010). The threat is directed towards preventing the access of one party to some resource (Robinson, 1972). This could be seen in cases of land use conflict between the permanently residing highlanders and mobile lowlanders as they share common environmental resources for cultivating and livestock rearing. The following conceptual framework clearly illustrates the causes and consequences of conflict as well as its resolving strategies.

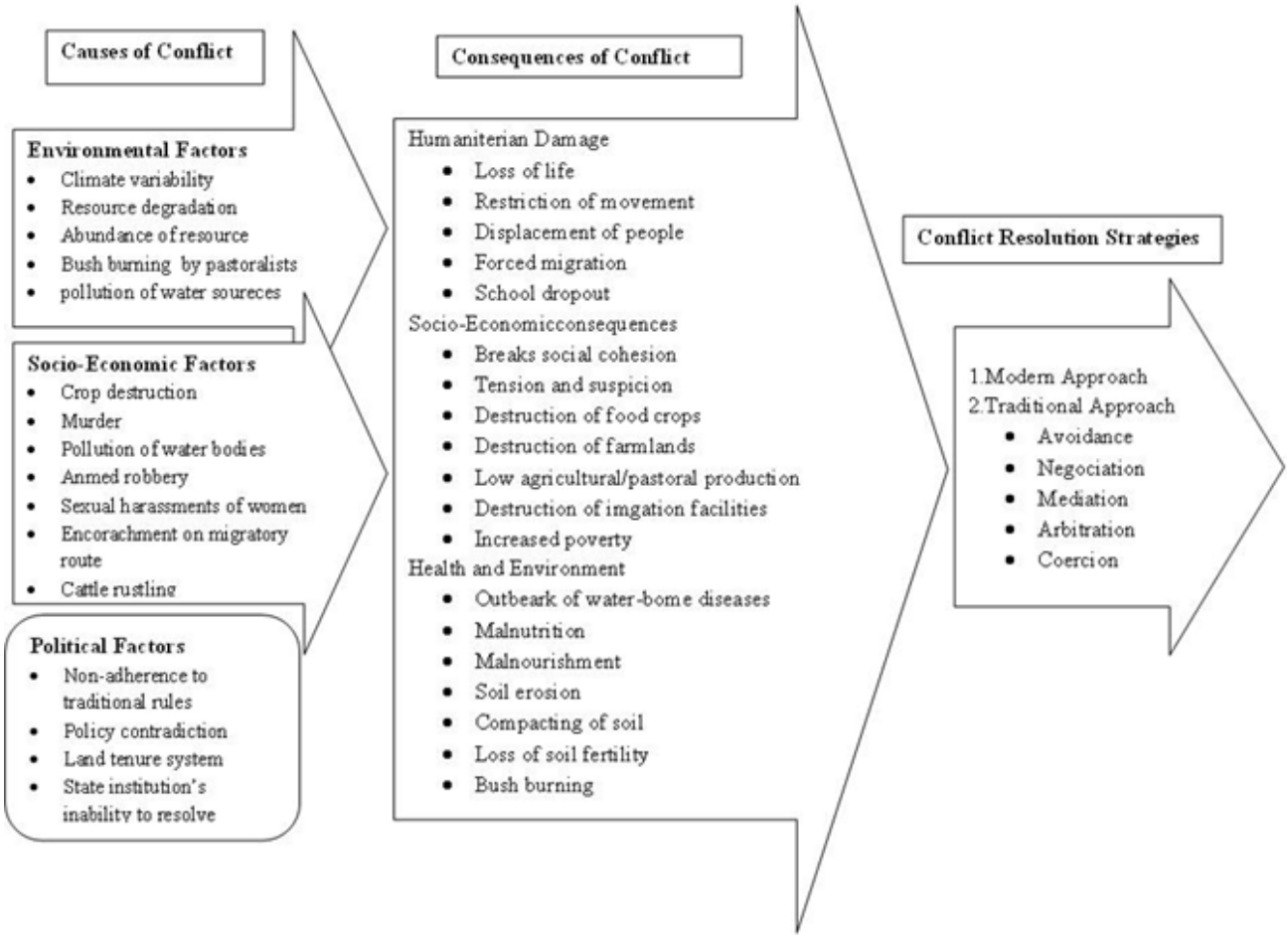

Figure 2.2: Causes, Consequences and Resolving Strategies of Conflict

(Adapted from Boateng, 2015)

From Figure 2.2 above, it can be recognized that sedentary farmers and pastoralist conflicts can be resulted from natural resource use (environmental), economic, socio-cultural and political factors. This is evident in the lack of access to resources and degradation of these resources (De Haan et al., 2014). Resource scarcity, on the other hand, can occur when local demand exceeds supply, when degradation diminishes supply, or when access is restricted. Climate change and natural hazards, socio-economic change can also affect the availability and distribution of natural resources (UN-IFTPA, 2010; Adamu and Umar, 2017). These factors are discussed below.

2.3.1 Environmental Factors

The customary natural resource access rules between the sedentary farmers and pastoralists are changing rapidly (De Haan et al., 2014; Adamu and Umar, 2017). As a result, conflict over renewable resources arise on issues such as who should have access to and control over resources, and who can influence decisions regarding their allocation, sharing of benefits, management and rate of use (Majekodunmi et al., 2014).

Thus, many authors identified that, resource competition resulting from increased human and animal populations and the resulting changes in land use patterns can lead to more conflict over the use of scarce rangeland resources like water and pasture (Akujobi et al., 2016; Onono, 2016; Bamlaku et al., 2015; De Haan et al., 2014; Gutema and Jema, 2014; Msuya, 2013; Michael, 2012; UN, 2012; Desalegn et al., 2007; Yirbecho et al., 2004; Yayneshet and Kelemework, 2004; Yemane, 2003; Ibrahim et al., 2015). However, competition does not habitually result in conflicts. It is rather driven by triggering activities of both sedentary farmers and mobile pastoralists (Dary et al., 2017). In areas where the two production systems interact, both communities are increasingly considering the option of expansion to each other's' holdings (Adelakun, Adurogbangba and Akinbile, 2015; Mortimore, 2009; Mwamfupe, 2015).

Conflict over the use of scarce resources (Ibrahim, 2015) ignited basically because of their stress adaptation strategies. Particularly, pastoralists respond to scarcity by mobilizing their livestock and family into less exploited grazing areas and water points (Gutema and Jema, 2014; FAO, 2011; Yayneshet and Kelemework, 2004). This is because pastoralism thrives and survives with mobility. Inconsistent rainfall patterns, often randomly and sparsely distributed over large areas, make the ability to move herds over large distances indispensable (De Haan et al., 2014).

However, the search for greener pastures by pastoralists usually brings them in contact with the sedentary farmers who are involved in crop production (Dimelu et al., 2017). In most cases, this contact results in an invasion of the farmland worked by the sedentary group, and the resulting conflicts are often violent and long lasting (Obioha, 2008; Yirbecho et al., 2004).

On the other hand, the restrictions of mobility can aggravate inter-group competitions over the available scanty natural resources. The sedentary farmers need to protect their means of livelihoods while the pastoralists are also determined to survive within such promising environment (Manu et al., 2014; Adamu and Umar, 2017). The interface intensifies during prolonged drought, such as when the long rains failed either in highlands or lowlands (Owuor, Mauta and Eriksen, 2011). Therefore, scarcity and mobility made conflicts inevitable between the sedentary peasants and mobile pastoralists (Markakis, 1994).

All these components represent the main causes of natural resource scarcity (Dary et al., 2017). Their role in contributing to conflict can be aggravated by other influences over which local community have very little control. Thus, disputes and grievances over natural resources can contribute to violent conflict when they overlap with other factors, such as ethnic polarization (Onono, 2016), high levels of inequity, poverty, injustice and poor governance (UNEP, 2012).

2.3.2 Socio-economic Factors

The second major cause of conflict between the sedentary farmers in the highlands and the mobile pastoralist in the lowlands is socio-economic reason that can be manifested through their production system. The production system in the case of sedentary peasants, the crops planted, modes of land preparation, and the means of mobilization of labor; in the case of pastoralist, the patterns of livestock management, and the terms of co-operation with sedentary peasants may lead to violent conflict between them (Blench, 2010).

More recently, several important forces have weakened the social glue and altered cultural identity priorities. Particularly, modern modes of communication and outmigration by youth unable to find employment in the pastoral sector expose these communities to other structures and ideas (De Haan et al., 2014). Moreover, where neighboring pastoral groups and the sedentary

peasants have ideological differences, it may supersede the mutual economic advantage (De Haan et al., 2014; Blench, 2010).

Thus, movement of pastoralists into new terrain, where language, religion, culture and landholding patterns are unfamiliar intensified conflict (Blench, 2010). In practice, increase in cultural and language divides among disputants worsen the problems of communication and acceptance; and subsequently, exacerbates potential for further conflict (Dimelu et al., 2017).

2.3.3 Political/Governance Factors

Lastly, all the causes described above are filtered through governance factors. While robust institutions, policies and processes can help to reduce the vulnerability of communities to resource scarcity, weak governance has the opposite effect. Governance also plays a critical role in preventing tensions from arising between competing user groups. Indeed, the way that governance factors address increasing resource scarcity influences the range of livelihood response options available to different groups (UN-IFTPA, 2010). When livelihood strategies shift in response to changes in the availability of natural resources, governance plays a critical role in preventing violent conflict. This implies those policies, processes and institutions, both formal and informal, are powerful forces that either facilitate or hinder access to natural resources, which is a root cause of conflict.

On the other hand, pastoral ethnicities are a minority in most countries and suffer from political marginalization (Onono, 2016; UN-IFTPA, 2010; Adamu and Umar, 2017). Pastoralists view government and administrative structures with a lot of suspicion. Their main complaints concern arbitrary limitations of their freedom of movement, unjustified taxation, and lack of protection (AU-IBAR, 2012). They feel excluded from national life; hardly enjoy any concrete benefits from the state, and do not trust their political representatives. Political power remains in the hands of the elites, since rulers seek to stay in power at any cost (UN, 2012). In addition, increasing lack of clarity in the geographical and administrative mandates of formal and traditional governance systems leads to overlapping and competing conflict resolution outcomes and exacerbates this sense of marginalization (De Haan et al., 2014; Michael, 2012).

Hence, governance itself can also be a source of conflict, even when it is designed to reduce tension or improve livelihoods. Natural resource policies and interventions are often made without the active participation of affected communities or enough consultation of stakeholders. In some cases, these interventions can conflict with traditional practices, while in others they can unintentionally benefit some groups to the harm of others (UN-IFTPA, 2010). Besides, poor planning, coordination and information sharing between development projects can also cause conflict as they unintentionally impact resource users or compete for the same limited resource. Furthermore, corrupt practices or decision-making processes can also be a direct source of tension (Ibrahim, 2015). Because, it may lead local government officials to become the winners through their exploitation of conflicts for their own rent seeking practice (Benjaminsen and Bat, 2009).

As can be indicated on Figure 2.2, conflict caused by different factors may result in diverse consequences. Conflict hinders the capability of a community to fulfill its basic human needs (Hundie, 2008; Omosa, 2005). This is because conflicts result in deterioration of various forms of assets (human, physical, financial, natural, and social) that constitute the capability of a community. The adverse effects of conflicts are manifested both by direct losses of assets and reduced access to resources, human death and suffering, restricted access to markets, restricted mobility, deterioration of social capital (Hundie, 2008), generation of inter-group tension, disruption of normal channels of cooperation and diversion of members' attention from group's goals (Dimelu et al., 2016; Manu et al., 2014; Gutema and Jema, 2014). Thus, the negative consequences of conflict range from mere envy, suspicion and jealousy to large scale destruction of lives and properties (Alimba, 2014). These negative impacts can be categorized into humanitarian adversities, social, economic, health and environmental impacts (Adamu and Umar, 2017).

i. Humanitarian Consequences

The outbreak of violent conflicts between sedentary peasants and pastoralists has terrible humanitarian consequences which manifests, in many forms and dimensions (Abbass, 2012). Sedentary peasants and pastoralists conflict involve physical fight which usually results in loss of human life and livestock (Gutema and Jema, 2014; Akujobi et al., 2016; Adisa, 2012). Others

include population displacements, forced migration, refugee and school dropout (Zeleza, 2008; Ofuoku and Isife, 2009; Manu et al., 2014; Okoli and Atelhe, 2014; Petentsebenkwange, 2014).

ii. Social Consequences

Conflicts can also create tense and unstable relationship between sedentary peasants and pastoralists which affect the level of collaboration between them (Tonah, 2006). The pastoralists consider the sedentary peasants as opponents of their survival and progress and vice versa. The loss of relationships because of fear to move to other places to meet their friends and relatives has led to loss of social security networks and safety nets (Michael, 2012). This situation breaks social cohesion which is manifested by mistrust and hostility between the two groups. It, therefore, creates an atmosphere of mutual suspicion and tension which is a threat to peace, security and progress of any society (Manu et al., 2014; Abbass, 2012; Bello, 2013; Tonah, 2006). Moreover, conflict affects education of children leading to obstacles in their development and mass displacement. Consequentially, this weakens the once mutually existing sedentary peasant and pastoralist relationships. This terrible situation becomes worst, especially when either the sedentary peasant or the pastoralist is categorized into a group relating to religion, tribe or region (Akujobi et al., 2016).

iii. Economic Consequences

The economic effects of conflict on both parties could be traced from the loss of crops and animals that are worth much money to the disputing parties (Petentsebenkwange, 2014; Dary et al., 2017). When sedentary peasants and pastoralists conflict occur during the farming season, there is the tendency that most farmers would not go to farm for fear of being attacked by others. This could also be seen in terms of losses that are associated with destruction of houses, properties and community assets. Resource based conflict usually deteriorate individual livelihoods and it affects development and provision of essential services in sedentary peasants and pastorals areas through disruption of the communities' livelihood systems by restricting access to natural resources (Gutema and Jema, 2014; Akujobi et al., 2016; Dary et al., 2017). This loss of properties in turn leads to food insecurity and liquefy people's livelihoods. So many scholars agree that, this situation further creates serious obstacle to local development, particularly agricultural activities (Moritz, 2010; Sekeris, 2010; Tonah, 2006; Bello, 2013; Okoli

and Atelhe, 2014; Abdulai and Yakubu, 2014 and; Manu et al., 2014). This is mainly because, conflicts result in damages to irrigational facilities, destruction of reservoirs, burning of rangelands and farmlands.

As a result, both parties find it difficult to participate in the local market (Manu et al., 2014). In the long-run their inability to contribute to the local economy has negative implication on the local economic development (Sekeris, 2010). This underdevelopment, therefore, increases impoverishment and destitution in both ecological regions (Tonah, 2006).

iv. Health and Environmental Consequences

Conflict between the sedentary peasants and mobile pastoralists may also lead to malnutrition and pollution of drinkable water which is responsible for outbreak of disease like cholera and guinea worm. The environmental impacts of conflict identified by researchers include bush burning, soil erosion, compacting of soil, loss of soil fertility and biodiversity (Adelakun, Adurogbangba and Akinbile, 2015; Ofuoku and Isife, 2009; Boateng, 2015). These situations in turn, produced unsuccessful outcomes which do not promise well for socio-economic sustainability and livelihood wellbeing of the community in the two ecological regions (Nchi, 2013; Akujobi et al., 2016).

Conflict itself is not a negative phenomenon; indeed, well-managed conflict can be an essential component of social change, democracy and development (UNEP, 2012). However, conflict becomes problematic when societal mechanisms and institutions for managing and resolving conflict break down, giving way to violence. Communities with weak institutions, fragile political systems and divisive social relations can be drawn into cycles of conflict and violence (UN, 2012). To end up this and look for lasting solution, various efforts ought to be made through different institutions. Currently, as Oyama (2014) ascertains, conflict management strategies are growing and increasingly becoming sophisticated both theoretically and practically.

The intervention strategies are based on both modern and traditional approaches. The modern approach involves intervention by law enforcement agencies as one of the methods of conflict

resolution (Adelakun, Adurogbangba and Akinbile, 2015). It is, however, acknowledged that traditional mechanisms are the most appropriate in dealing with the root causes of conflict and establishing sustainable peace (Abate, 2011). Experience has shown that peace agreements founded on traditional systems and mediated by traditional institutions are the ones that have the most legitimacy and the highest chances of success. Thus, traditional leadership through customary institutions is dominating in the most remote and marginalized pastoralist and sedentary farming communities (Bamlaku et al., 2015; Ibrahim, 2015). Once a dispute case is in the hands of elders, there can be very little room for an individual to advance his interests by force. This seems to be the norm no matter how long it takes the elders to process the dispute and reach a settlement (Yayneshet and Kelemework, 2004). Their traditional institutions and systems of mutual social support provide the main framework for coping with the situation. When grazing lands are lost, arrangements are made to share existing grazing lands. Where access to wells is lost, arrangements are made to dig new ones or rehabilitate those that had fallen into abandonment (Michael, 2012).

In general, nowadays it has become more apparent that to reduce and resolve conflict in pastoral and sedentary peasant areas, the focus should go beyond pasture and water (Nicholson and Solomon, 2010). Both the customary and statutory systems are in existence, however, the sedentary farmers and pastoralists differ in their preference of conflict resolution mechanisms. While the pastoralists in the lowlands prefer the informal mechanisms, the sedentary farmers in highlands favored the formal mechanism (Ibrahim, 2015). In general, there should be a paradigm shift from conflict resolution to conflict prevention.

2.4 Concepts of Livelihood, Vulnerability and Coping Strategies

In explaining the concept of highland-lowland linkages and its resulting impact on the livelihood of both communities, a well-developed conceptual framework designed by Chambers and Conway (1991) has been utilized. The framework is flexible and can be adjusted to the study of vulnerability context of the highlanders and lowlanders and, used to observe how interdependency between them can be used as coping strategies at different periods of stress and shocks. Moreover, it has been employed in examining the role of transforming structures and processes in promoting mutual development between the highlanders and lowlanders.

Furthermore, the outcomes of such strategies can also be best appraised with the help of this framework.

2.4.1 Concept of Livelihood

A livelihood comprises the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stress and shocks and sustain its capabilities and assets both now and in the future, while not undermining the natural resource base (Chambers and Conway, 1991). The framework has five components: the vulnerability context, livelihood assets, transforming Structures and processes, livelihood strategies and livelihood outcomes and goals. See the conceptual framework described below.

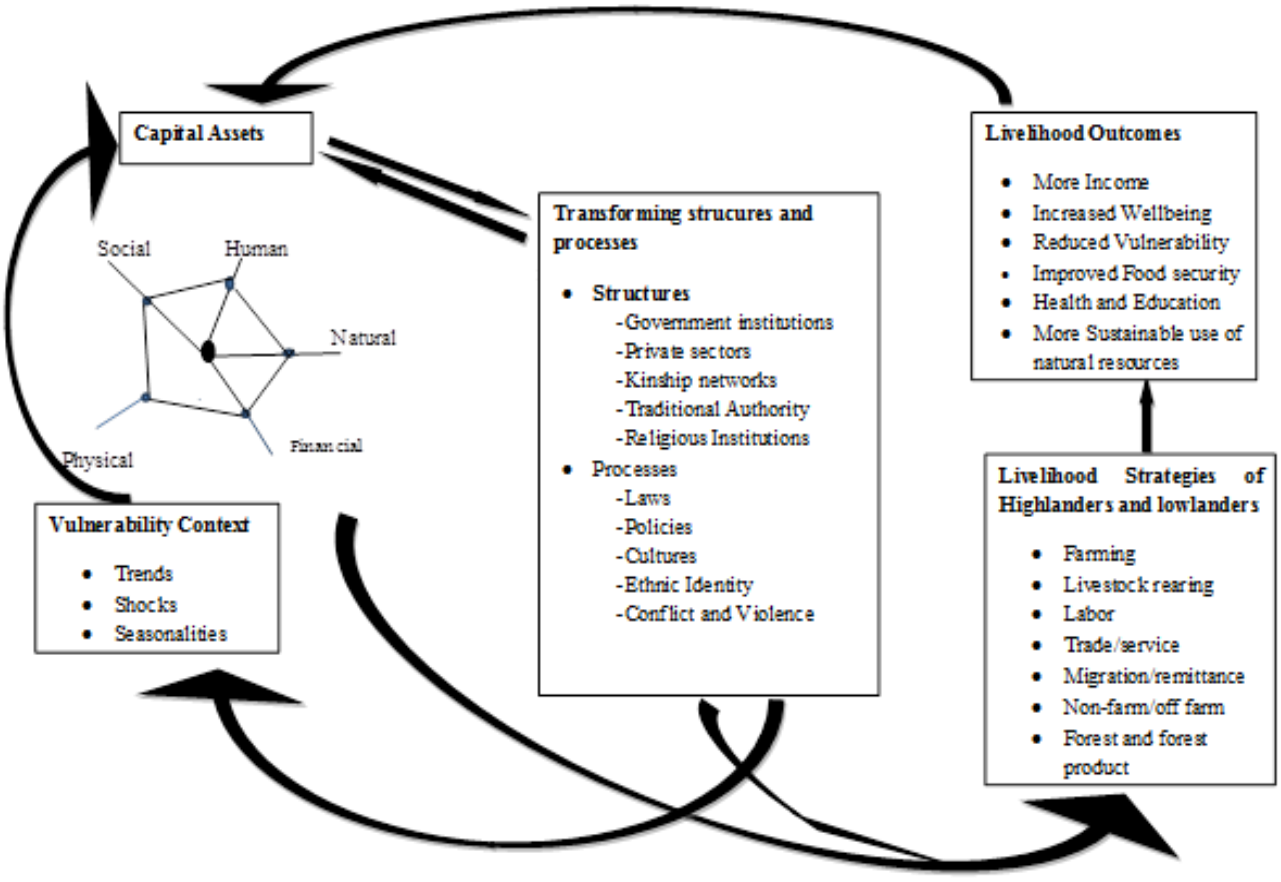

Figure 2.3: The Sustainable Livelihood Framework

Source: Adapted from Chambers and Conway, 1991

i. The Vulnerability context

The first component of the framework is the vulnerability context. This context forms the external environment in which people exist and gain importance through direct impacts upon their asset status (Devereux, 2001). It comprises trends (i.e. demographic trends; resource trends; trends in governance), shocks (i.e. human, livestock or crop health shocks; natural hazards, like floods or earthquakes; economic shocks; conflicts in the form of national or international wars and seasonality (i.e. seasonality of prices, products or employment opportunities) and represents the part of the framework that lies furthest outside stakeholder's control (DFID, 2000; Chambers and Conway, 1991).

ii. Livelihood assets

The vulnerability problem inevitably leads to productions of livelihoods asset to survive and sustain life. The assets people make can be categorized into five: human, social, natural, physical, financial, and political capitals (Chambers and Conway, 1991).

Human capital comprises skills, knowledge, health and ability to work, while social capital includes: social resources, including informal networks, membership of formalized groups and relationship of trust that facilitate co-operation and economic opportunities (DFID, 2000). On the other hand, natural capital contains natural resources such as land, soil, water, forests and fisheries Physical capital embrace basic infrastructure, such as roads, water and sanitation, schools, ICT; and producer goods, including tools, livestock and equipment. And financial capital consists of financial resources such as saving, credit, and income from employment, trade and remittances (DFID, 2000; Chambers and Conway, 1991).

iii. Transforming Structures and Processes

Since livelihoods are formed within social, economic and political contexts; transforming structures and processes come to be the third components of the framework. This transforming structures and processes represent the institutions, organizations, policies and legislation that shape livelihoods. They are of central importance as they operate at all levels and effectively determine access, terms of exchange between different types of capital, and returns to any given livelihood strategy (Shankland, 2000; Keeley, 2001; Chambers and Conway, 1991). Moreover, structures include the "hardware" (private and public organizations) that set and implement

policy and legislation, deliver services, purchase, trade and perform all manner of other functions that affect livelihoods; and the "software" that includes mechanisms in which structures and individuals operate and interact (DFID, 2000). Change in these contexts predictably creates new livelihood obstacles or opportunities.

iv. Livelihood Strategies

Within the existing structures and processes people obviously endeavor to cope-up with stress and shocks. This calls for scheming livelihood strategies. These livelihood strategies comprise a combination of varieties of activities that people undertake to achieve their livelihood goals (DFID, 2000). They are dynamic and enable to respond to changing pressures and opportunities and adapt accordingly (Ellis, 2000). How people access and use these assets, within the social, economic, political and environmental contexts, form a livelihood strategy. The range and diversity of livelihood strategies are enormous (Gemechu et al., 2016). An individual may take on several activities to meet his/her needs. One or many individuals may engage in activities that contribute to a collective livelihood strategy. Within households, individuals often take on different responsibilities to enable the sustenance and growth of the family. In some cultures, this grouping may expand to a small community, in which individuals work together to meet the needs of the entire group (DFID, 1999). Thus, strategies lead to more or less satisfactory livelihood outcomes (Dereje and Abeje, 2018).

v. Livelihood outcomes and goals

Livelihood outcomes and goals are the final components of the sustainable livelihood framework. They are the achievements of livelihood strategies, such as more income, increased well-being like self-esteem, health status, access to services, sense of inclusion; reduced vulnerability (e.g. better resilience through increase in asset status); improved food security (e.g. increased in financial capital in order to buy food) and a more sustainable use of natural resources (DFID, 2000; Ellis, 2000; DFID, 1999). Besides, livelihood outcomes directly influence the assets and change dynamically the form of the pentagon and offer a new starting point for other strategies and outcomes (DFID, 2000; Ellis, 2000).

2.4.2 Vulnerability of the Highlanders and Lowlanders

Vulnerability is usually defined as a product of two factors: exposure to risk, and ability to cope (Chambers, 1989; Majekodunmi et al., 2014). Vulnerability is also linked to asset ownership.

Accordingly, the more assets people have, the less vulnerable they are; conversely, the greater erosion of assets the higher would be the level of vulnerability (Rass, 2006 in Majekodunmi et al., 2014).

However, the sustainability of a given livelihood is not only measured by its productive outcomes, but equally by its resilience to shocks, seasonal changes and trends (Majekodunmi et al., 2014). Here, shocks might include natural disasters, wars, and economic downturns. Seasonal changes also manifested in fluctuation of resources availability, income-generating opportunities, and demand for certain products and services. In addition, trends in politics and governance, technology use, economics, and availability of natural resources, can pose their own serious obstacles to the sustainability of livelihoods (DFID, 2000). Hence, resilience to shocks, stress and trends is an important measure of sustainable livelihoods.

In general, as Dinku (2018) and Devereux (2006) identified, these causes of vulnerability can be categorized into three clusters: environmental (drought), political (conflict and failures of governance) and socio-cultural (gender bias). Thus, in the following discussion vulnerability of the two livelihood zones (highlanders and lowlanders) has been examined consecutively.

Studies show that vulnerability of the highlanders is associated with environmental shocks and stress like land degradation, land fragmentation and poor agricultural practices. Yanda (2003) indicated that these problems in the highland areas raise their vulnerability levels to the extent that the size of some farms can no longer sustain household's social and economic needs. In addition, crop failures due to environmental shocks have also led to deteriorating living conditions among the sedentary subsistence farmers (Tolossa and Baudouin, 2004).

On the other hand, scholars identified that vulnerability of the lowlanders is associated with decline in rangeland condition (Coppock et al., 2018), continuing drought, increased competition for grazing lands, recurrent conflict (Dinku, 2018), disordered livestock trade, limited regional market options (Devereux, 2007) and widening restrictions on access to key resource (Abdirizak et al., 2010). Moreover, constraints to productive and beneficial livelihood diversification for example, weak transport, power and telecommunications infrastructure, irregular income making, difficulty to get bank loans, low cash incomes and thin markets, cultural practices and restrictive policies also intensify the vulnerability of the lowlanders (Dyer, 2012). Livestock

asset, particularly cattle are the riskiest physical assets given recurrent effects of drought and forage scarcity (Coppock et al., 2018). Hence, the combined effect of these shocks, stress and trends put the sustainability of their livelihood in question.

However, which ecological regions' community (the highlanders or lowlanders) are more vulnerable to environmental, political, socio-cultural and economic shocks, stress and trends is a literature gap to be bridged in this study.

2.4.3 Coping Strategies of the Highlanders and Lowlanders

Coping strategies refers to the behavioral adjustments adopted during livelihood shocks (Devereux, 2006). Communities confronted with a livelihood shock that undermines their access to resource can respond in several ways. Based on the magnitude of the shock they encountered, highlanders and lowlanders react in different ways. In the highland areas, some of the coping mechanisms of agriculturalists include cultivation of cash crops instead of cereals (Manlosa et al., 2019), hiring of land for limited period, out-migration to the neighboring lowland areas, and short-term employment in the informal sectors, especially in the lowland areas (Yanda, 2003). Other coping mechanisms adapted by highlanders in response to crisis include searching for wage labor in the nearby areas (Dereje and Abeje, 2018), selling farm oxen, selling firewood and receiving milk cows from relatives in the lowlands (Tolossa and Baudouin, 2004). Moreover, crop-cultivators respond to scarcity of land by expanding the territory of their farm plot into grazing and virgin lands, which is one major cause of conflict with their neighboring lowlanders (Gutema and Jema, 2014). Furthermore, agricultural diversification (Manlosa et al., 2019; Gebru et al., 2018) and intensification were used as principal coping strategies by sedentary agro-pastoralists (Dereje and Abeje, 2018; Alemayehu et al., 2018).

On the other hand, the lowlanders developed a wide range of strategies in response to various shocks that reduce their productivity. These strategies include selecting and using different species of livestock to optimize use of various ecological niches, in the dry season when resources are scarce; managing herd composition in regard to age and sex to meet the dual challenge of meeting household needs and preserving herd viability (IIED, 2006). Moreover, they practice their indigenous adaptation and coping mechanisms like herd splitting, redistribution of extra livestock within social networks, diversification of livestock comprised of

camels, goats, sheep, cattle and donkeys to enable them to exploit different areas of the range during any period of the year, formation of complex social security networks based on kinship and friendship (Bamlaku et al., 2015; IIED, 2006; Mortimore, 2009) livestock loans and gifts (Coppock et al., 2019); and reliance on relief food (Bamlaku et al., 2015).

Moreover, the lowland communities apply coping strategies like migration to urban centers and neighboring regions and countries (Coppock et al., 2019; Morton, 2006; Kejela, Bezabih and Waktole, 2005), communal area enclosures and preparing of hays/forage, charcoal making and firewood collection, petty trading (Gemechu et al., 2016), brokering on livestock trade, property theft and cattle raiding, engagement in contraband trade; short-cycle vegetable and fodder production for their livestock, construction of water points, harvesting wild fruits and tree products, destocking and selling of asset (Bamlaku et al., 2015; Morton, 2006; Scoones and Adwera, 2009) and farming (Devereux, 2006; Kejela, Bezabih and Waktole, 2005; Adugna and Aster, 2007). This is an indicator that pastoral livelihoods retain a certain degree of vulnerability through higher level of livelihood diversification (Dinku, 2018). Diversification to non-pastoral income generating activities was the other options of coping hardships by the lowlanders. The intensity and proportion of engagement in such activities are determined by demographic factors and mobility status of households in the lowlands (Achiba, 2018; Dinku, 2018). All these strategies emerged perhaps because of their higher degree of vulnerability to shocks (Majekodunmi et al., 2014).

Furthermore, a prominent coping strategy implemented by pastoralist in the lowlands is mobility. Mobility is clearly a matter of life and death for the lowland pastoral community to cope with drought (IIED and SOS, 2010 cited in AU-IBAR, 2012; Gemechu et al., 2016; Achiba, 2018). Indeed, it is the only way to access water and pastures (Gutema and Jema, 2014), maximize animal productivity, access markets (IIED, 2009 cited in FAO, 2012), and avoidance of tsetse fly (Majekodunmi et al., 2014). In spite of this, some government-initiated policies to sedentarize these mobile pastoralists and constrain their mobility as their way of life was perceived as an obstacle to “development” and state control. However, some scholars argued that mobility of herds in pastoral areas where there is high temporal and spatial variability of ecosystem should

be encouraged (Yayneshet and Kelemework, 2004). Likewise, Devereux (2006: 172) quoted the feeling of Somali pastoralist in this regard as follows:

> "The Government wants to settle us, to turn us into farmers. But we look at the problems of the farmers in the highlands and we ask why the Government hasn't solved their problems. Every year millions of tons of food aid go to those farmers, who are supposed to be growing their own food. Does the Government want to turn us into beggars like them?"

Hence, the need for mobility in the use of range resources as coping mechanism against ecosystem vulnerability ought to be understood by the governments (Kejela, Bezabih and Waktole, 2005; Gemechu et al., 2016).

In general, it is through engagement in different livelihood activities and adoption of various coping strategies that the highlanders and lowlanders attain their livelihoods goals and outcomes. Among the coping strategies, mobility towards the adjacent ecological region, which in turn creates a platform for highland-lowland linkage, contributed a lot in building resilient livelihoods of both communities.

2.4.4 Determinants of Livelihood Strategies

The livelihood outcomes of rural households are generally influenced by a range of socio-cultural, geographical, economic and political factors. Explanatory variables considered to run regression analysis by scholars include an array of factors (Bazzezew et al., 2013) like socio-cultural, demographic, economic, geographical and political. The following conceptual framework (Figure 2.4) is constructed to present determinants of livelihood strategies and their relationship with livelihood outcomes of households.

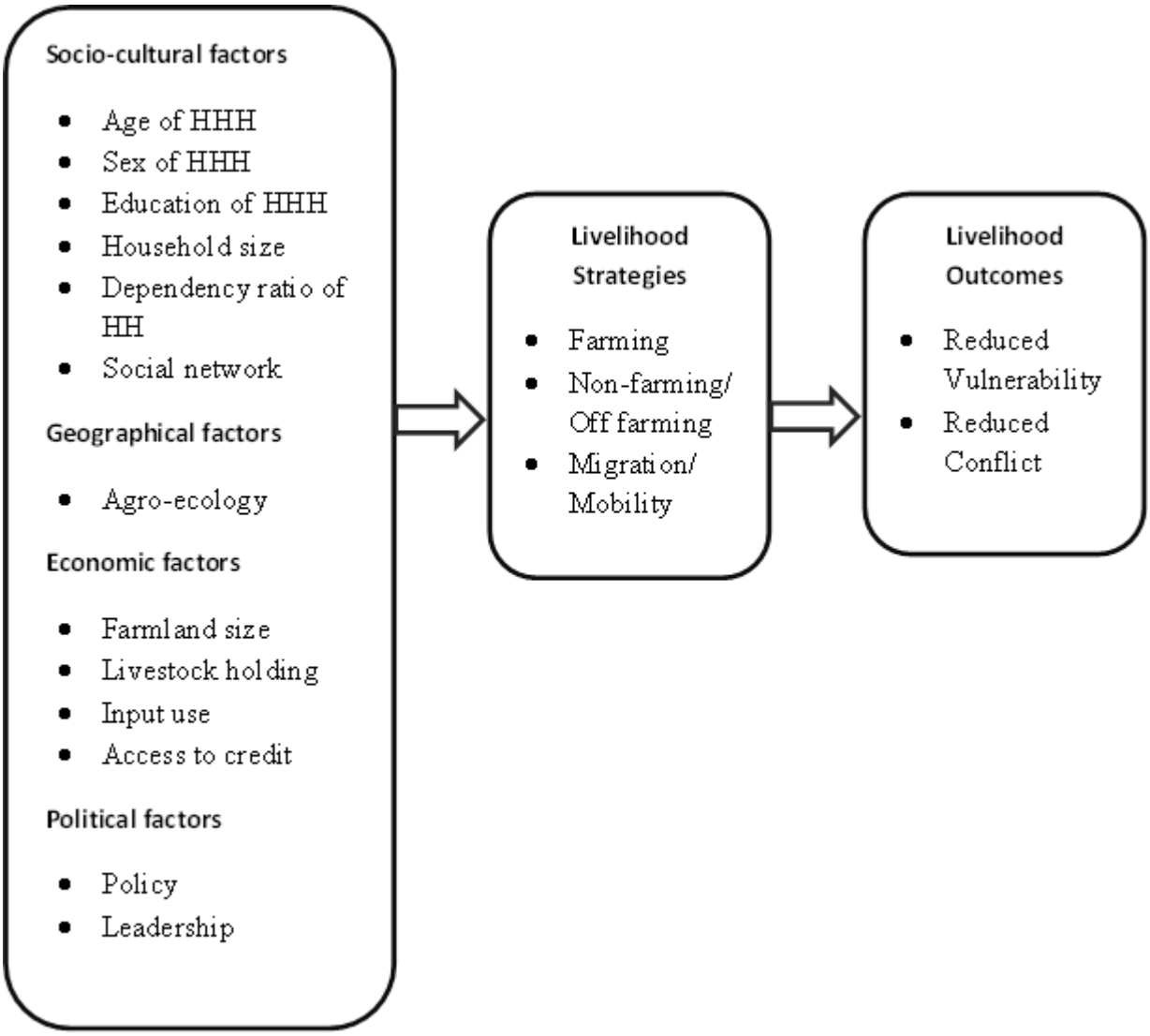

Figure 2.4: Determinants of High-Lowland Livelihood Strategies

(Constructed by the Author, 2019)

2.4.4.1 Socio-cultural Factors Affecting Livelihood Strategy Choices

Age of household head: - the household head's age positively and significantly affects the household's livelihood strategies choice into farm and non/off farm activities (Sultana and Liu, 2017). This indicates that old aged farmers are very much interested to expand the income strategies into non/off farming activities. The probable justification for positive association is that as age increases farmers have more chances to have more children, this in turn helps availability of labor to engage in diverse activities. The second reason might be the increment in the number of children may result in more family members and this can create more demand for

basic necessities (Sultana and Liu, 2017). Conversely, study made by Seid (2016) revealed that age of household head affected farmers' decision to diversify livelihood strategy negatively. Holding other variables constant, the likelihood of household head simultaneous choice of farm strategy decreases, when age increase by one year relative to the base category relying on farm alone (Seid, 2016). The possible reason is that elder farmers are well established and more experienced in agricultural production, more resistant to new ideas and information; they are more likely to be set in their ways and may not attempt into new diversification activities.

Gender of household head: - the gender-based division of labor within households is one of the most recognized aspects of how a household pursues its livelihood strategies. What men versus women do is in part reflective of their culture, that is, male and female roles limited by what is thought fitting male and female behavior (Peng et al., 2017). Thus, each sex plays important consequences for the household livelihood portfolio. Sex had a negative and significant impact on the diversification of sample households' livelihood strategies choice into off/non-farm activities. This implies that female-headed households are not participating in off/non-farm livelihood strategies (Sultana and Liu, 2017).

Education of household head: - Educational attainment has been identified as one of the most important determinants of non/off farm earnings. As the schooling year of household heads for education increases by one unit, the probability of participation in agriculture plus non/off farm income source will increases (Dessalegn and Moges, 2011). This implies that the highly educated households diversify their livelihood options through acquiring salaried jobs and self-employment activities (Dessalegn and Moges, 2016; Adugna and Wagayehu, 2012). Conversely, the findings of Sultana and Liu (2017) revealed that education level of household head negatively and significantly affects the household livelihood strategies choice into non-farm, off-farm and a combination of them. The potential clarification is that most of the sample household's head attained normal education with below primary level which not adequate to be officially working, and ability challenging income options.

Household size: - household size showed positive and significant correlation with household livelihood diversification (Dessalegna and Moges, 2016; Seid, 2016). As the number of total family size increase by one, the probability of engagement in non-farm increases by 6.2%. This

might be due to the correlation between larger family size and availability of an extra labor force that can be engaged in non-farm activity (Adugna and Wagayehu, 2012). Furthermore, large families are able to practice multiple activities, whereas smaller ones tend to practice only crop production with a livestock activity.

Dependent family size: - it is the number of people with age greater than 65 and less than 15 years residing in the household. The number of dependent family size and livelihood diversification has negative and significant correlation (Dessalegn and Moges, 2016; Dilruba and Roy, 2012). The rationale behind this might be that an increase in dependency ratio, leads to shortage of working hands to earn from diversified activities to fulfill the household needs. This means an increase in the number of household members below 15 and above 64 years, who are unable to engage themselves in some activities, affects livelihood diversification negatively (Dessalegn and Moges, 2016).

Social Networks: -village networks allow households to obtain market information. For instance, market prices or the conditions of migrant labor in a faraway costal town much more easily. The desire to keep information costs low explains why individuals and households in the same agro-ecology would lean towards performing similar activities (Huber et al., 2015). Villages with a higher income disparity have higher diversity of income sources and thus more individualized decision making processes relating to individual households' livelihood strategies, leading to more specialized households and more heterogeneous village structures (Huber et al., 2015).

2.4.4.2 Geographical Factors

Agro-ecology as a variable captures influence of locational factors on household annual incomes. It was found that households in the *kolla* and *woina-dega* areas earned less annual incomes compared to those living in the *dega* agro-ecological zone. This could be explained by their inaccessibility and poor infrastructure (Bazzezew, 2015; Peng et al., 2017).

Highland livelihoods are highly dependent on forest resources susceptible to environmental change, over-collection, market price fluctuations, and engagement in low-skilled and insecure migrant labor (Huber et al., 2015). These vulnerable livelihoods do not appear to be resilient and sustainable until remote households are fully integrated into the educational system and are

entitled to the compensation scheme for rendering ecosystem services in the context of various platforms. Moreover, Peng et al. (2017) argued that ecological policy that encourages ecological compensation has a direct positive effect on the choice of local off/non-farm livelihood strategies.

2.4.4.3 Economic factors

Land area: - this refers to total agricultural land area per capita in the household. Land holdings per capita are significantly larger in the highlands, whereas arable land in the valley bottom is limited but allows for two harvests per year (Huber et al., 2015). Household's land ownership area has a negative and significant relationship with the livelihood strategies choice into non-farm, off farm and non-farm and off-farm activities. Therefore, it may be suggested that indigenous people households that have more land are more involved in livestock based farming activities and thereby intensifying their annual cash income (Sultana and Liu, 2017).

Livestock holding: - livestock is a core and liquid asset for improvement of livelihood. Study indicates that the possession of livestock in TLU negatively and significantly affects the household livelihood strategies choice into non-farm, off-farm and a combination of both strategies at less than 1% probability levels (Sultana and Liu, 2017). This implies that a household having bigger size of livestock are less probable to expand the living strategies into non/off-farm activities in compared to small number of TLUs pursuers. On the other hand, result of study made by Seid (2016) reveals that livestock holding positively and significantly influenced the use of farm plus non-farm livelihood strategy at 5% significance level. This is explained by the fact that herd size is a proxy for wealth status of farmers (Seid, 2016). Those farmers with large herd size can easily meet their family food and other requirements and have a better chance to earn more money to invest in non-farm income generating activities with an intention of accumulating assets for the future.

Input use: - use of improved farm inputs like chemical fertilizer, quality seeds and improved breed of livestock has negative and significant inspiration on the household choice of selecting expanded income approaches into farm and off-farm strategies (Sultana and Liu, 2017).

Households with significant access to use of recent farm inputs are less probable accept farming with off-farming activities as a livelihood strategy than those who have no contact (Seid, 2016). The probable explanation is that using current technology most possible increase the invention and efficiency of crops and livestock product, and this can support household to get admission to more food and produce more income to facilitate their family necessities

Access to credit: - access to credit negatively and significantly affects the household's livelihood strategies choice into off-farm activities (Sultana and Liu, 2017; Seid, 2016). Thus having access to credit decreases the probability of a household using on-farm and non-farm activities. This is because farmers take credit from lenders to use it for purchasing different types of inputs such as fertilizer, improved crop varieties and irrigation facilities, to improve their agricultural production and productivity. These in turn help them to satisfy family consumption requirements and improve their income rather than using a combination of on-farm and non-farm activities (Seid, 2016). Conversely, Dessalegn and Moges (2016) revealed that access to credit services and diversification in agriculture activities has found significant and positive association. For households that receive credit, the probability of involvement in off- farm activity in addition to agriculture will be raised.

2.4.4.4 Political Factors

There is a gap in the political status between the lowlanders and highlanders as they are unequally integrated in the current government policies, where only households from the lowlands are entitled to own plots of forest land in Asian countries (Huber et al., 2015) and the reverse happened in Ethiopia. This happens despite a broad consensus among all stakeholders that the most effective way to protect forest resources is to support the highland population with programs for alternative income sources, such as the cultivation of high-value medicinal plants (Huber et al., 2015).

Household head's participation in local leadership positively and significantly inspires household livelihood strategies choice into non-farm activities. The study results infers that household head's participation in leadership activities influence them to expand living strategies into non-

farm strategies. The possible cause may be household heads' sharing in local leadership may help to gather informative knowledge and experience (Sultana and Liu, 2017).

This refers to the range and combination of activities and choices that people make in order to achieve their livelihood goals (DFID, 2000). These livelihood strategies differ for different groups of households based on the contextual conditions outlined above. There are significant differences between farming households and the other two household groups in economic incomes, with local off-farm and labor-migrant households in general having higher income per capita than farming households (Peng et al., 2017). Thus, non-agricultural work appears to improve well-being for households. Farming and labor-migrant households have higher intensity land utilization than local off-farm households, which reflected in crop yield and expense of fertilizer and pesticides (Peng et al., 2017). Moreover, it is widely claimed that migration and mobility have positive effects on livelihoods.

More income, increased well-being, reduced vulnerability, improved food security and more sustainable use of natural resources are the common outcomes of successful livelihood diversification strategy (Chambers and Conway, 1991; DFID, 2000). Thus households that engaged in the farming, livestock rearing, and non-farm livelihood strategies were able to earn higher incomes (Alemu, 2012; Wang and Yang, 2011). However, farming households tend to fail to engage in other livelihood activities, particularly in non-farm/commercial strategies, due to limitations of labor quality (education level, skills), financial capital, geographical location, and other factors (Peng et al., 2017).

2.5 The Role of Highland-Lowland Linkages in Improving Livelihoods of the Communities

Human beings can depend on varied ecologies for their livelihoods. Crop production and livestock keeping, are the major livelihood activities in the rural highland and lowland ecological regions, respectively. Hence, communities in highland and lowland areas interact through sharing of agricultural and grazing land, social services, trading and employment opportunities (Korner and Ohsawa, 2003; Jodha, 2002; Huber et al., 2015; Yanda, 2003). However, there is a

significant population growth in the highland areas leading to natural resource depletion, serious environmental problems, and land use conflicts. On the other hand, expansion of agricultural activities in the lowland areas leads to diminishing of pasture lands, which in turn, leads to overstocking and overgrazing (Yanda, 2003). This situation, consequently, leads to the decline in livestock population and transhumance practice. The immediate responses to such a situation have been change in livelihood strategies and change of life style among the people in both the highland and lowland areas. In some instances, all pastoralists in the lowland areas tend to turn into agro-pastoralists, and farmers from the highland areas are opening farms in the lowlands (Huber et al., 2015; Yanda, 2003). This makes contemporary rural livelihoods strategies to shift from one mode of life to the other (Alemayehu et al., 2018). From this it can be inferred that the livelihood strategies of the highlanders and lowlanders seem inseparable.

Although its magnitude varies, both communities in the highland and lowland are vulnerable to various shocks (Soini, 2006). And they cope-up with these shocks through adapting different coping strategies discussed above. By and large these coping strategies are mutually interdependent. For instance, noticeable coping mechanisms among agriculturalists in the highland areas include changing of cultivation from food crops to cash crops, hiring of land, out-migration, and employment in the informal sectors (short-term employment, especially in the lowland areas), sell labor in the farms within and outside the villages, especially in the lowland areas, tractor owners residing in the highland areas go to work for the pastoralists in the lowland areas and involvement in trade (often with the lowlanders) (Yanda, 2003).

On the other hand, coping strategies used in lowland areas include: involvement of the pastoral communities into farming activities, involvement in afforestation programs, provision of education to children (Yanda, 2003) and involvement in non-pastoral business (Achiba, 2018). Hence, these coping strategies would not be resilient and sustainable until the two ecological regions are fully integrated (Huber et al., 2015).

2.6 Theoretical Framework of Highland-Lowland Linkages and its Impact on the Livelihood of Communities

In this study, combination of the sustainable livelihoods framework and the extended Human–Environment System (HES) model have been used as a theoretical framework to investigate the

nature and extent of the links between highland and lowland communities of Bale administrative zone and consequent impacts on the livelihood of the communities. This framework was developed to guide the entire research process in such a way that the highlands and lowlands are spatially interlinked. These highland and lowland regions were treated as anthropogenic ecosystem (Hug and Baccini, 2002). Their spatial linkage can be broadly categorized into economic, ecological, socio-cultural and political linkages. The linkage between them can be noticed through the flow of, agricultural products (livestock and crops), natural resources, human resource, capital (remittance), and agricultural technologies. The flow direction of these resources, products and services are two directional, from highland to lowland and vice-versa. Here, the main driver of highland-lowland interaction is the national and international markets under the influence of national policies (Huber et al., 2015).

However, the type, magnitude, nature and pattern of the linkages can be influenced by some factors like differentials in resource endowment, availability and status of infrastructure and services (road, educational and health institution), market area, ethnic and tribal structure (Workneh, 2011; Stoffel et al., 2002). As indicated on Figure 2.4, these factors are placed in the middle of the two ecological regions, and thus can facilitate or obstruct the linkages of the highland and lowland communities.

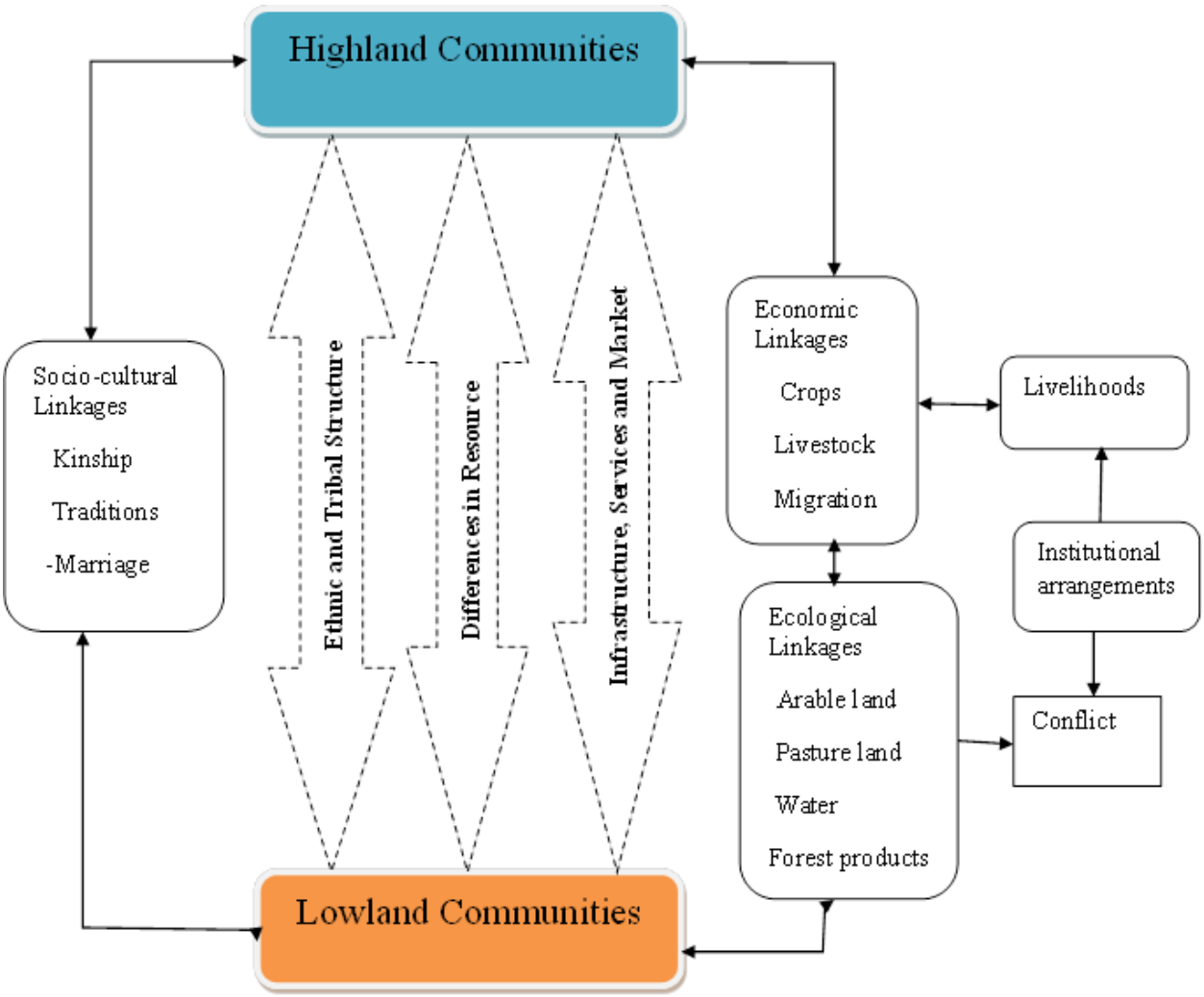

Figure 2. 5: Conceptual Framework of Highland-Lowland Linkage

Source: Adapted from Workneh, 2011.

To build a sustainable model for the analysis of socio-economic and livelihood issues, integrating the factors and variables used in sustainable livelihood frame work to the HES framework is worth noting. Thus, within this extended framework it is possible to use empirical data to characterize the most prominent interferences within and among layers of actors, assets, and livelihood strategies to analyze highland-lowland linkages in the study area.

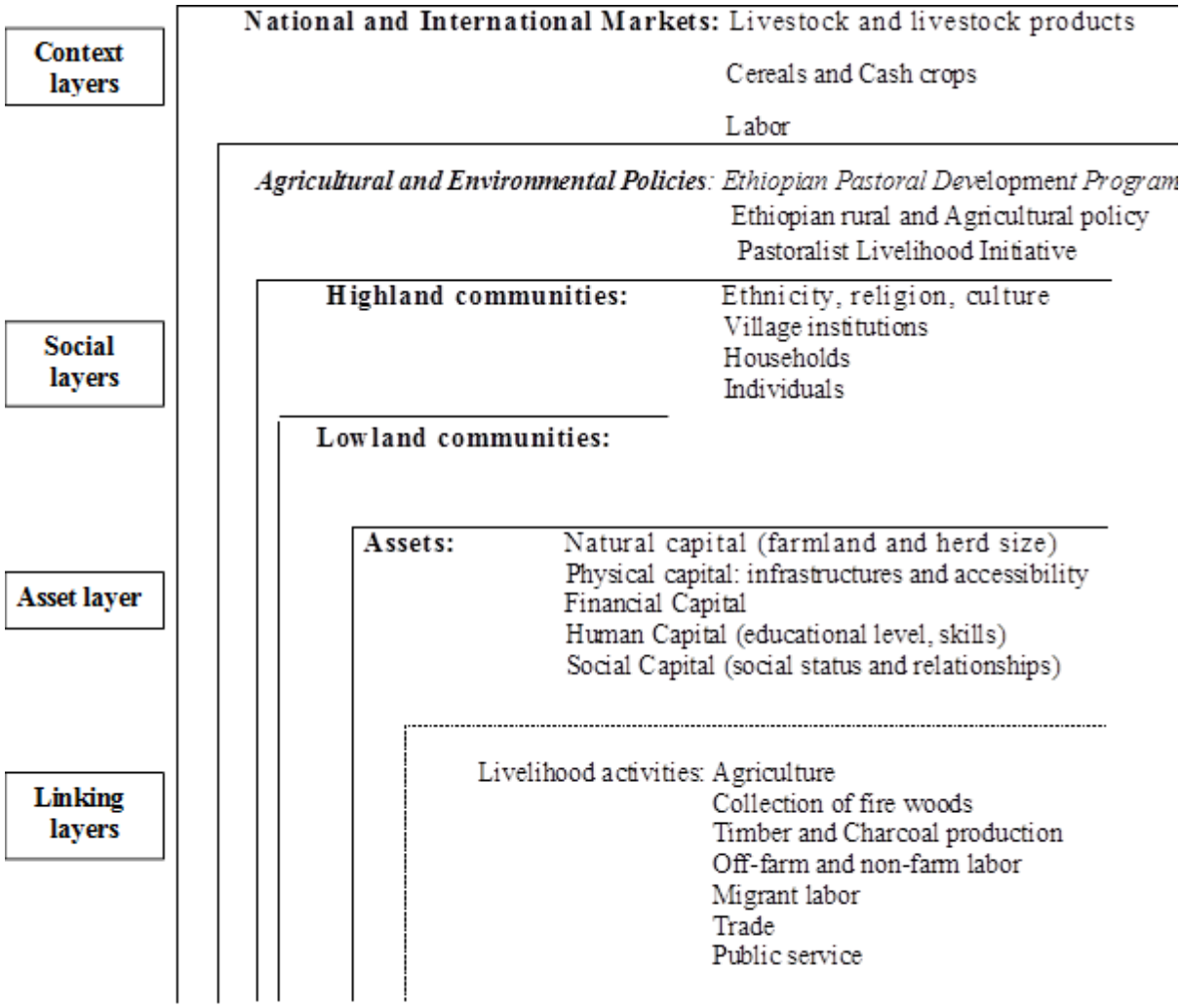

Figure 2.6: The Extended HES Framework

Source: Adapted from Huber et al., 2015.

Therefore, in this study an attempt was made to explore the interaction between communities of the two ecological regions within the existing context layers. The existing context layer incorporates the transforming structures and processes. These structures and processes are the social, economic and political contexts within which the social layers pursue livelihoods. This further leads to the development of asset layer, in which communities in different ecological regions produce asset in the social layer. At the end, there are linking layers, which plays role in connecting the social layers, in this case the highlanders and lowlanders.

2.7 Empirical Evidences

2.7.1 Factors Influencing Highland-lowland Linkages

In this sub-section effort was made to identify and discuss different factors influence highland-lowland linkages in various regions of the world, in general and Ethiopia in particular. Highland and lowland regions throughout the world, but particularly in developing economies, are interlinked through complex socio-ecological interactions on various levels (Ives, 2004). Although economic development and societal change often start in the accessible lowlands, remote highland areas provide vital resources for these processes, such as natural resources, agricultural products, and labor surplus in most of Asian and Latin American countries (Mahdi et al., 2009). Besides, they are bases for more intangible benefits, such as recreation, tourism and religious inspiration to well over half the world's population (Ives, 2001).

However, in these continents lack of appropriate effort towards raising resource productivity in fragile highlands, sustainable harnessing, regenerating of niche resources and ensuring equitable trade promotion based on highland perspectives are deep rooted problems that hinder highland-lowland linkages (Jodha, 2002). The other real challenge of highland-lowland linkage is lack of reliable connectivity with each other except for newly developed seasonal roads in Asian countries like Nepal. Moreover, marketing infrastructure such as communication, storage, transportation facilities in the areas from where most of the products originate, is very poorly developed. The local harvesters and traders do not get reliable market information, and lack of access to information results in inefficiencies, most often to the loss of poor producers in the highlands (Gupta, 2010; Jodha, 1997). Another factor that significantly affects highland-lowland interactions in this country is the quality of governance. Normally, bad governance is a primary cause of many of the negative reactions between highlands and lowlands (Ives, 2001).

Unlike Asian and Latin American countries, in most regions of Africa, the highlands are more densely populated, accessible and serve as economic growth poles (Mcintire et al., 1992; Soini, 2006; Jodha, 2002); while the lowlands are marginal with limited livelihood options that are vulnerable to environmental shocks (Devereux, 2006). In these regions, many highland communities are ethnically or culturally distinct from lowland populations, and local highland communities are often highly divergent from each other (Korner and Ohsawa, 2003). Thus,

social mobility is determined mainly by culture. This in turn, impacts the mutual socio-economic and ecological interdependency between the two communities.

Likewise, in Ethiopia, most agricultural production takes place in the *dega* and *woina-dega* agro-ecological zones, where land productivity has traditionally coincided with the densest rural populations in the highlands (Chamberlin and Schmidt, 2011). As a result, more than 69% of the rural populations were settled on the highlands (Mesfin, 1988). However, most producers in this ecological region are smallholders, occupying on average less than one hectare of land per household (CSA, IFPRI and EDRI, 2006). And this smallholder production is dominated by five major cereal crops accounting for almost three-quarters of the total cultivated area, and about 68% of total production (Chamberlin and Schmidt, 2011). In these agro-ecological zones, land degradation is one major factor that contributes to low agricultural productivity, which is reflected in cereal yields averaging less than one thousand kilogram per hectare in most of the highlands, and milk yields only about one- fourth of the average for all developing countries (Chamberlin and Schmidt, 2011). Such low productivity on farms generally less than two hectares in size, contributes to extreme poverty and food insecurity, as evidenced by recurrent problems of famine and incomes of less than one dollar per person per day (Pender et al., 2001). Thus, this self-insufficiency of the highlanders undoubtedly contributes for weak linkage with their adjacent lowlanders in Ethiopia.

On the other hand, the pastoralist area (lowlands) that covered about 57% of the land mass of Ethiopia supports only about 14% of the total population's livelihoods (World Bank, 2004). These agro-ecological regions are, often described as marginal with scarce, highly variable and uncertain rainfall pattern and fragile ecology; and thus, prone to food insecurity (Workneh, 2011). To fill their production gap and sustain livelihoods, they may demand crop products of the highlanders in exchange of livestock and livestock products. In this regard, study made by Mcintire et al. (1992) found that about 93% Ethiopian pastoralists obtained their earnings from the sale of livestock and their products, while purchases of cereals and other foods accounted for 40% of their expenditures.

However, the lowlanders that are supposed to provide livestock and livestock products to the highlanders are poorly integrated due to lack of surplus product, market and other physical infrastructure (Workneh, 2011). The other decisive factor that affects highland-lowland linkage in Ethiopia is social factor. The intensity of linkage between highlanders and lowlanders is determined by the kinship ties they have. As a result, their relationship is based on social bond. Central to this is the donation of milk and milk products by the lowlanders to the poor highland peasant households. In this regard, priority is given to households that have kinship with the lowlands (Tolossa and Baudouin, 2004). Likewise, movement of livestock from lowland Somali region to highland Ethiopia is very limited, not even to large urban markets like Addis Ababa. The main reason for such limited trade is differences in perceptions. Somali meat is valued by consumers in the Gulf States and Somalia, but not by Ethiopian highlanders, who prefer highland breeds (Devereux, 2006). The same author revealed that traders from Somali region prefer to send their sheep and goats to Somalia, since they could not get adequate market in the highlands of Ethiopia (Devereux, 2006). This implies that cultural difference is also other contributory factor of highland-lowland linkage in Ethiopia.

2.7.2 Causes and Consequences of Conflict between Highlanders and Lowlander

In this sub-section an attempt was made to review how different factors initiated conflict in various regions of the world. Besides, the experience of countries in managing and resolving conflict has been reviewed.

Competition over access to and control over natural resources arising from its decrease in quality and quantity; population growth and weak political institutions are identified as major drivers of conflicts at global level (Homer-Dixon, 1995; Shetima and Tar, 2008; Ibrahim, 2015). Although its magnitude and frequency is less, resource based conflict also observed in developed nations. Available literatures reported among others, conflict over fishery between Canada and Spain (Maxwell and Reufeny, 2000); border conflicts between China and its various neighbors (Gleditsch, 1998).

In developing countries, conflicts are natural, particularly where there is resource scarcity, prevalent poverty and limited participation in economic, political and cultural decision making (Asmelash et al., 2015). For instance, conflict in Philippines is attributed to deforestation, land

degradation and high population growth and population displacement (Maxwell and Reufeny, 2000). Bangladesh is experiencing the same since 1970s, (Homer-Dixon, 1995). Thus, conflicts have been a tradition in pastoral and agro-pastoral communities of developing nations over resources like arable and grazing lands as well as water. Singh and Sinh (2002) also noted that in developing countries, conflicts over natural resources has increased in number and severity because of growing competition between agriculture and other land uses as both human and animal population increases. However, climate change, poor infrastructure, low education level and increased competition for scarce resources aggravated the situation (Yemane, 2003).

In Africa too, expansion of farm land at the expense of grazing land derived by a growing population is a common phenomenon (Shettima and Tar, 2008). And that seems why Moritz (2010) and Olaniyan et al. (2015) opined that conflict is pervasive in West Africa, where sedentary farming and mobile herding production systems are integrated at the household, community, and regional levels. These regions of Africa are still contending with sedentary farmer-mobile pastoralist conflict over ownership of land and forest resources, arising from increase in the number of users since 1980s.

In the Senegal valleys, conflict over natural resources worsened into boundary conflicts between Senegal and Mauritania in 1999 (Homer-Dixon, 1999; Schmitz, 1999). In Northern Ghana too, conflict has increased in recent times between sedentary farmers and mobile pastoralists over access to resources (Boateng, 2015; Dary et al., 2017). In Nigeria, conflict between the sedentary peasants and pastoralists provoked by crop damage, ethnic rivalry, farm fragmentation, and indiscriminate bush burning and government attitude for farmers and pastoralists (Adelakun et al., 2015; Majekodunmi et al., 2014; Dimelu et al., 2016; Adamu and Umar, 2017). This is also supported by Olaleye et al. (2010) and Ibrahim et al. (2015) who disclosed that crop damage and competition for land and water were the predominant factors of conflict in Nigeria. In Mali, the main causes of conflict was the national policy that gives priority to agricultural development at the expense of pastoralism that results in large-scale conversions of dry season pastures to rice fields (Benjaminsen and Bat, 2009). Besides, rent seeking behaviors of local officials contribute in persisting land use conflicts in the area. Hence, officials are benefiting from conflicts, but the mobile pastoralists in the lowlands and farmers in the highlands are losing out (Benjaminsen and

Bat, 2009; Moritz, 2010). In this country, in some cases, conflicts intensified with other ethnic, political, and religious engagements (Moritz, 2010; Dimelu et al., 2016). Similarly, in Cameroon causes of conflict include destruction of crops by cattle for being negligent, failure to construct cattle proof fences, invasion of pastures by other cattle in communal grazing areas, blocking or destroying water points, encroaching into grazing land as well as having an elitist attitude (Manu et al., 2014). In addition, pressure on natural resources due to the growth in the human and cattle population, un conducive policy environment to the resolution of conflicts are identified as main drivers of conflict (Petentsebenkwange, 2014). In southern Niger, the population increase and the introduction of a cash economy and market activity led to the expansion of farmland to the boundary of pasture area, which in turn resulted in conflict over shortage of grassland during the rainy season (Oyama, 2014; Akujobi et al., 2016).

In Northern Africa, the relationship between mobile pastoralist and sedentary farmers has, for centuries, been shaped by both cooperation and violence (Shettima and Tar, 2008). Recently however, high population growth, wide-spread food insecurity and recurrent drought events have increasingly challenged traditional resource sharing mechanisms, while competitions for scarce land resources have intensified and leads to conflict (Fratkin and Roth, 2005; ILRI, 2006).

In East African countries, similar factors such as inadequate grazing reserve and stock routes, changes in land tenure system, insufficient pastoralism legislations, and expansion in agricultural policies, economic factors and climate change have also been identified as the long-term causes of conflicts (Mwamfupe, 2015). For instance, in Tanzania major factors for the occurrence of conflicts between sedentary farmers and mobile herders were found to include policy deficiencies and contradictions, insecurity of land tenure, inadequacy of capacity of the local institutions, corrupt practices, poor coordination in resettling the migrants, inadequate capacity in village land use planning, and the heavy handed approaches used to resolve the conflicts (Mwamfupe, 2015; Benjaminsen et al., 2009; Msuya, 2013).

In Ethiopia, conflicts are related to the availability of grass and grazing space. It happened when the highlanders and lowlanders move with their livestock to the boundaries of other group. In case of Tigrayan and Afar, both groups have partially different seasonal grazing patterns, the

Tigrayans going down from the highlands during the summer rainy season and the Afar nomads coming up from the lowlands following a less rigid temporal pattern related to extremely erratic rainfall in the Danakil desert margins (Yayneshet and Kelemework, 2004; Nyssen et al., 2009). This led them into conflict. Like most other African countries, such conflicts mostly relate to competition over resources such as land, cattle and water points. In addition, some socio-cultural factors such as the quest for social honor and prestige were also important in these areas (Yayneshet and Kelemework, 2004). Likewise, conflicts in the Somali Regional State are concerned with access to productive resources; mainly water and pasture resource as well as irrigation water and irrigable farm land (Gutema and Jema, 2014). Thus, sharing of the common and limited grazing land and water points leads them into competition and conflicts with their adjacent agro-pastoral communities.

The other region of Ethiopia where frequent conflict observed is the Borena zone of Oromia Regional State. Here, the mobile pastoralist of Borena conflicted with the neighboring sedentary peasants of Garre because of political and administrative boundaries (Michael, 2012). The same author revealed that they also conflicted with Gabra of Keniya due to ethnic rivalries and revenge. Besides, they disputed with the Konso people (Ethiopia) owing to access to resource.

In sum, previously conflicts were merely due to overlap of farmlands with cattle routes, where farmers grow crops on the routes, but recently, this conflict has escalated, taking another dimension of ethnic and religious differences with little effort from government or community leaders to address the problem in these regions of Africa (Ibrahim, et al., 2015). Thus, it is resulting in destructive consequences.

The conflicts between the sedentary farmers and mobile pastoralists resulted in economic losses (Akujobi et al., 2016). These severe economic losses experienced by sedentary farmers in African countries include reduction in output, loss of properties, and scarcity of food. Conflict also disrupt and threaten the sustainability of production and agriculture (Moritz, 2010). As a result, it reinforces circles of extreme poverty and hunger, and destroys social status, food security and affects mostly the extremely marginalized groups that include women and children. This further affects education of children leading to obstacles in their development and mass

displacement. This implies that conflicts have direct impact on the lives and livelihoods of both communities participated (Mwamfupe, 2015; Ibrahim et al., 2015; Petentsebenkwange, 2014). Consequentially, this weakens the once mutually existing sedentary farmer-mobile pastoralist relationships (Ibrahim et al. 2015).

In Ethiopia also, it is true that resource based conflict causes loss of human life, loss of livestock and crop, destruction of property, and further decline in rangeland resources, and generally deteriorates an individual's livelihood (Gutema and Jema, 2014; Yayneshet and Kelemework, 2004) and restricted access to market (Gutema and Jema, 2014).

Therefore, once conflict prompted between the highlanders and lowlanders, strategies need to be devised to manage the issue. Countries of the world utilize various mechanisms to resolve conflicts. For instance, in Nigeria, Cameroon, Tanzania, Ethiopia and Mali intervention by law enforcement agencies, dialogue between the parties, and involvement of local community leaders in fostering peace between the parties were implemented either separately or in combination (Adelakun et al., 2015; Majekodunmi et al., 2014; Dimelu et al., 2016; Olaleye et al. 2010; Ibrahim et al., 2015; Gutema and Jema, 2014; Yayneshet and Kelemework, 2004).

2.8 Geographic Perspectives of Highland-lowland Linkage and Livelihoods

Geography is enormously wide ranging discipline. As a result, most geographers have a difficulty of keeping up with their own area of research (Gomez and Jones, 2010). This arises from the subsequent paradigmatic shifts made in the discipline and its confusing positions in the arena of science.

However, in conducting geographic research the major concern goes to making four kinds of analysis. These are spatial analysis which, concerns with distributions of phenomena; ecological analysis which, concerns with the relationships between humans and their physical environment; and regional analysis that concerns with spatial and ecological analysis in areal differentiations; movement of people, goods and idea (Hagget, 1990). Here regionalization serves as an organizing unit of the geographic realms. Within such spatial units there are spatial practices, processes, flows and movements that influence the where and how of human livelihoods (Lefebvre, 1991). Therefore, studies made to understand interaction between people and their

surroundings had got attention since the introduction of humanistic approach in the field of geography.

Hence, space and time are important organizing units of research in the field of geography. For the philosopher and geographer Immanuel Kant, these are fundamental because it is impossible to think of some aspect of the world that does not have a spatial and temporal dimension (Gomez and Jones, 2010). So elements of the world are generally considered to be locatable within two and three dimensional space. This view of space enables us to describe things as being closer, further away, and adjacent to each other, and scale of interaction and movement between spatial units (Gomez and Jones, 2010). Thus humanistic approach can be used to investigate causes and effects of the various shocks and stresses on the livelihoods of people in different geographical regions.

In this study highland and lowland agro-ecological regions were employed as space organizing units. This is because agro-ecological zones are important approach used to organize rural geographic space to understand its productivity and processes of exchange (Chamberlin and Schmidt, 2011). Highland and lowland as spatial units are organized on the basis of biophysical attributes of soil, topography (elevation above sea level), and climate (rainfall, temperature and humidity). This enables to organize production systems into relatively homogenous units (Hurni, 1998).

Highland-lowland linkage, which is a means for exchange of resources, products and experiences, is responsible for improvement of rural livelihoods. In order to develop benefits from such interaction, both spatial units demanded contextualize policies and strategies. This in turn calls for policy makers' attention to design strategies that harness the mutual benefits between the two parties.

This is because such interactions demands autonomous movements of people from one geographical region to the other which improves peoples coping capability against various shocks and stresses occurred spatially and temporally. This it enables them to devise livelihoods options which can be realized through appropriate policy. Thus, the highland-lowland interaction has become critical for survival and to cope with stress seasons for both highland and lowland

communities. Furthermore, the mutual dependency and cooperation that it represents plays a crucial role in maintaining peaceful relations (Owuor, Mauta and Eriksen, 2011).

In general, sustainable development demands strengthening spatial relations between communities of different agro-ecological regions through appropriate institutions with legal frameworks. Hence, this study ought to contribute for the development of human geography by empowering people to comprehend and interpret their environment and thus become aware of the quality of live in their region/agro-ecology.

2.9 Conclusion

In the context of complementary highland-lowland linkage, flow of resources, products, services, ideas, technologies from one region to the other should fill the gaps of each other. The extent and intensity of their linkage is expected to increase with the increasing physical, administrative, and market integration of previously, loosely interlinked areas (Jodha, 2002). The interaction between highlanders and lowlanders is multifaceted and expressed through ecological, economic, social and political interfaces. Most studies made so far familiarized the importance of economic linkages, but little attention has yet been given to the other aspects. Hence, substantial effort is required to increase the knowledge and experience about other dimensions of these linkages, leading to more sustainable livelihood strategies of both communities.

Mobility between highland and lowlands, on one hand, strengthen the linkage between them, and on the other hand, households use it as coping strategies during shock and stress seasons. Seasonally the lowlanders move with their cattle (transhumance) to highlands in search of pasture and water. Conversely, the highlanders expand their farming land to the boundaries of the lowlands. This also helps them as a coping strategy due to high population pressure on the arable lands of the highlanders (Yanda, 2003). However, this may, sometimes leads to conflict over the use of communal resources. From the reviewed literatures, it was found that economic, social, and institutional and governance factors played role in arousing or deterring conflict. However, the literature on conflicts in the horn of Africa has mainly focused on the analysis of the causes of inter-state or ethnic conflicts and very little emphasis was given for intra-state but different livelihood zones' community conflict that arises from ecological resource scarcity and their impact on the livelihood of these communities (Gutema and Jema, 2014). Thus, to promote

sustainable peace and enhance symbiotic relationship between the highlanders and lowlanders, the root causes of conflict ought to be studied from the point of view of economic, social, political and ecological issues.

Therefore, to sustain their mutual interdependency and reduce hostile relations between the highlanders and lowlanders, it is worth noting to examine their livelihood activities and coping strategies. To this end, the sustainable livelihoods framework is employed to find out suitable interventions that reduce livelihood vulnerability and tension between them. This is mainly because, understanding livelihood strategies of a specific area, particularly where livelihoods compete for the same limited natural resources is a key to designing conflict prevention or management strategies.

In general, efforts need to be initiated by governments in strengthening the linkage between the highlanders and lowlanders through promoting productivity of fragile and marginal areas, infrastructure to address accessibility and raising human capacities through social sector services. Otherwise, resource competition resulting from increased human and animal populations can lead to conflict over the use of these scarce resources that damages the already built asset basis and further weaken the relationship between them.

CHAPTER THREE

DESCRIPTION OF THE STUDY AREA

In this chapter an attempt was made to give background information about the study area (Bale zone) and study sites (sampled highland and lowland *woredas*). To this end, contexts of location and size, physical and socio-economic characteristics of the area are presented.

3.1 Location and Area of Bale Zone

This study is carried out in Bale administrative zone. The zone is located in the Southeastern part of Ethiopia and the Oromia Regional National State. Geographically, Bale zone is located between 5^0 11'03"- 8^0 09'27" N and 38^0 12'04"- 42^0 12' 47"E [Bale Zone Department of Finance and Economic Development (BZDFED, 2004)]. In its relative location, it shares common boundary with Somali National Regional State of Ethiopia in the east, and with east Hararge zone in the northeast, west Hararghe zone and Arsi zone in the north, west Arsi zone in the west and Guji zone in the southwest (BZDFED, 2004). Refer Figure 3.1.

In terms of area, Bale zone is the second largest zone in Oromia National Regional States and covers an area of 63,555km^2. It accounts for 17.5% of the total land surface of the region. The zone comprises 18 *woredas*, two special administrative towns, 20 towns and 351 rural *kebele* administrations (BoFED, 2014). The *woredas* include Agarfa, Barbere, Dawe-Kachen, Dawe-Serer, Dinsho, Gasera, Ginnir, Goba, Gololcha, Goro, Gura-Dhamole, Harena-Buluk, Laga-Hidha, Madda-Walabu, Dello-Menna, Rayitu, Sawena and Sinana. The two special administrative towns are Goba and Robe.

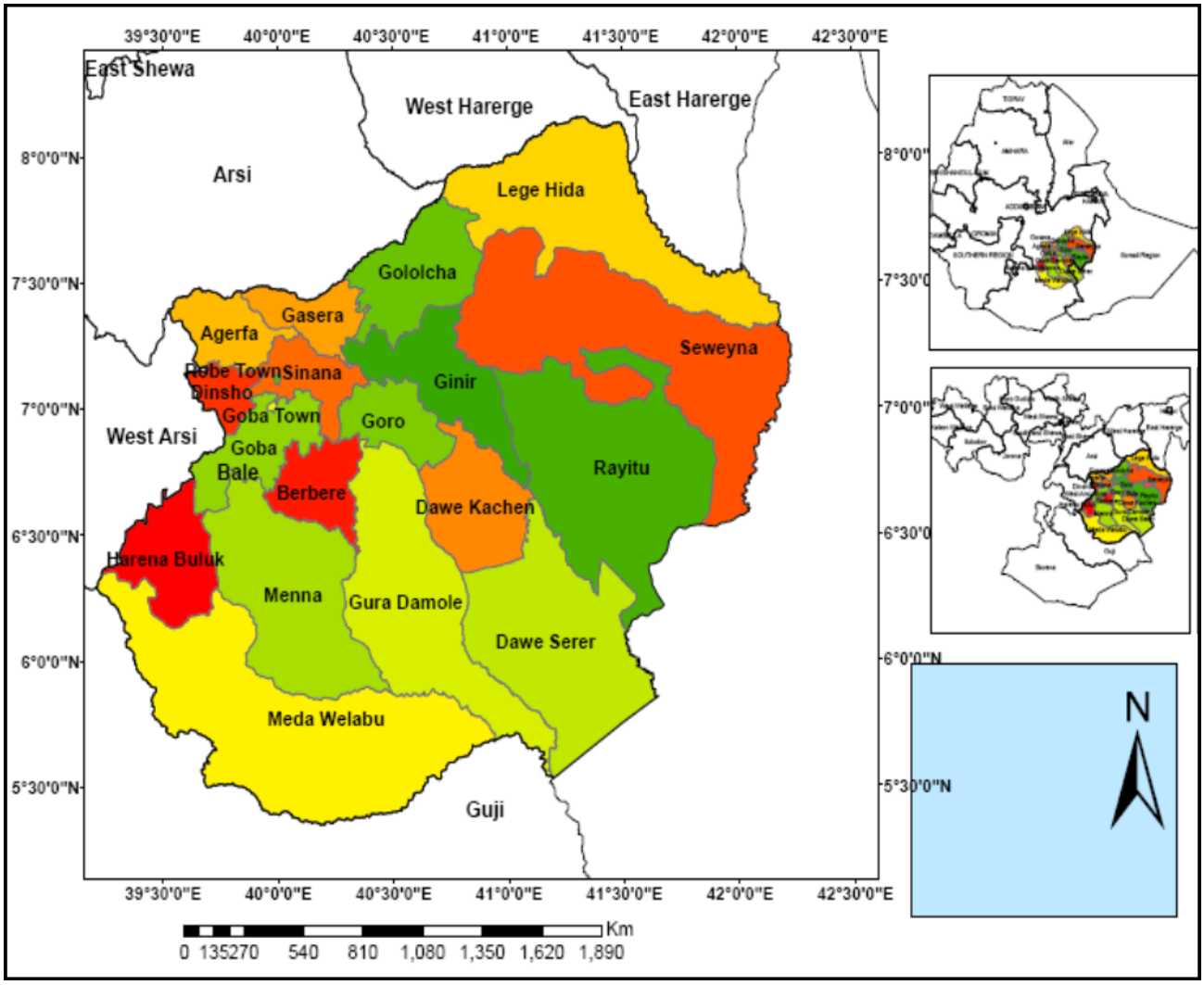

Figure 3.1: Absolute and Relative Location of Bale Administrative Zone

Source: Shape files Data in GIS-Lab, 2017

3.2 Physical Characteristics

3.2.1 Topography

Structurally, the zone is situated southeast of the Great Rift Valley system and forms part of the southeast highlands and associated lowlands of Ethiopia. The administrative zone has a large physiographic diversity, characterized by different topographic features like plains, plateaus, mountains and small hills. There is a great altitudinal variation between the highest and the lowest point. The surface rises from the lowest point of below 500 meters above sea level in southeast Rayitu, Gurra-Dhamole and Madda-Walabu *woredas* to the highest ranges culminating

at 4,377 meters above sea level at *Tullu-Dimtu* in Goba *woreda*, which is the second peak in the country (BZDFED, 2004).

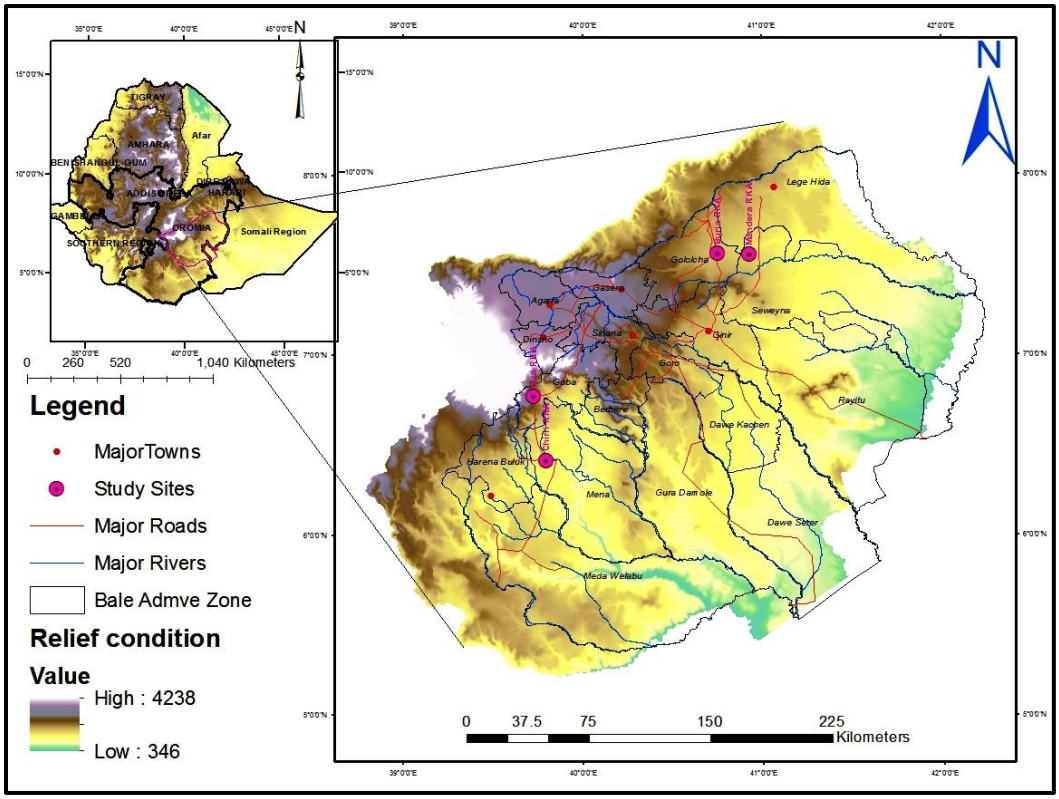

Figure 3.2: Relief of Bale Zone Sample *weredas* and rural *kebele* Administration

Generally, internal and external forces over the past geologic history have created the following physiographic divisions in the administrative zone.

a. **The high plateaus (*dega* and *wurch*):** cover areas over 2500 meters elevation and accounts for 9% of the total areas of the zone. This highland plateau in the zone embraces the *Sannete* plateau (Bale Mountain National parks) and mount *Tullu-Dimtu*.
b. **Low Plateaus (*woinadega*):** cover areas located from 1500 to 2500 meter above sea level, and accounts for about 22% of the total areas of the zone. It covers the north, central and north- western part of the zone. Administrative *woredas* of Gololcha, Gasera, Goba, Sinana, Dinsho, Agarfa and parts of Dello-Menna, Harena-Bulluk, Madda-Wallabu and Laga-Hidha are found in this physiographic division. These two

physiographic regions form the highland ecology. Thus, this highland of Bale covers about 31% of the total land surface of the zone.

c. **Lowlands (*kolla*):** cover areas below 1500 meter elevation and account for about 69% of the total areas of the administrative zone. The lowlands include flat plains, river valleys and gorges broken up by hills and ridges (BZDFED, 2004). The administrative *woredas* of Dawe-Kachen, Dawe-Serer, Gurra-Dhamole, Rayitu, Sawena and parts of Madda-Walabu, Ginnir, Laga-Hidha, Dello-Menna, and Harena-Bulluk are in this physiographic division.

The lowlands are further subdivided into three categories based on their geographic location as:-

a. **Southwestern lowland:** this comprises the administrative *woredas* of Madda-Walabu, Harena-Bulluk (partly), Dello-Menna (partly) and Gurra-Dhamole. It is found in the watershed of *Gennale* River.
b. **Eastern lowland**: it includes the administrative *woredas* of Laga-Hidha, Sawena, Ginnir and Northern Rayitu.
c. **Southeastern lowland:** this comprises the administrative *woredas* of Dawe-Kachen, Dawe-Serer and the South Rayitu low plains. It is found in the river basin of *Weyib*.

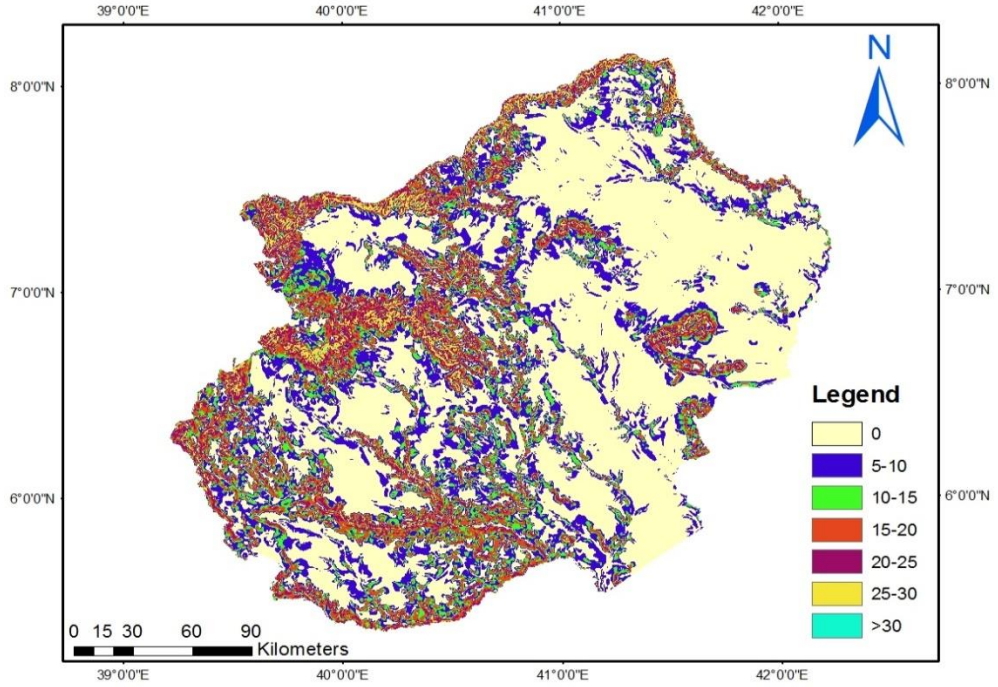

Figure 3.3: Slope of Bale Administrative Zone

3.2.2 Climate

The varied topographic features of Bale administrative zone are responsible for micro-climatic variation. This varied topographic feature is attributed to the following five thermal zones (BZDFED, 2004).

a. **Cold temperature areas:** located around the peaks of major mountains, particularly, in Goba, Dinsho and Agarfa *woredas*. It covers about 3% of the total area of the administrative zone.
b. **Cool thermal zone:** located around the escarpment of the zone. It covers about 8% of the total area of the zone.
c. **Moderately cool temperature zone:** covers the administrative *woredas* of Gololcha Gasera, Sinana, Dinsho, Agarfa, Goba, and parts of Goro, Gurra-Dhamole, Harena-Bulluk, Dello-Menna, Ginnir and Madda-Walabu. It covers about 18% of the total area of the zone.
d. **Moderately warm temperature zone:** covers the administrative *woredas* of Goro, Ginnir, Gololcha, Sinana, Dinsho, Dello-Menna, Harena-Bulluk, Agarfa, Gasera, Rayitu, Sawena, Laga-Hidha, Madda-Walabu and Gurra-Dhamole. It covers about 60% of the total land surface of the administrative zone.
e. **Warm temperature Zone**: covers the administrative *woredas* of Rayitu, Sawena, Laga-Hidha, Madda-Walabu and Gurra-Dhamole. It covers about 11% of the total land surface of the zone.

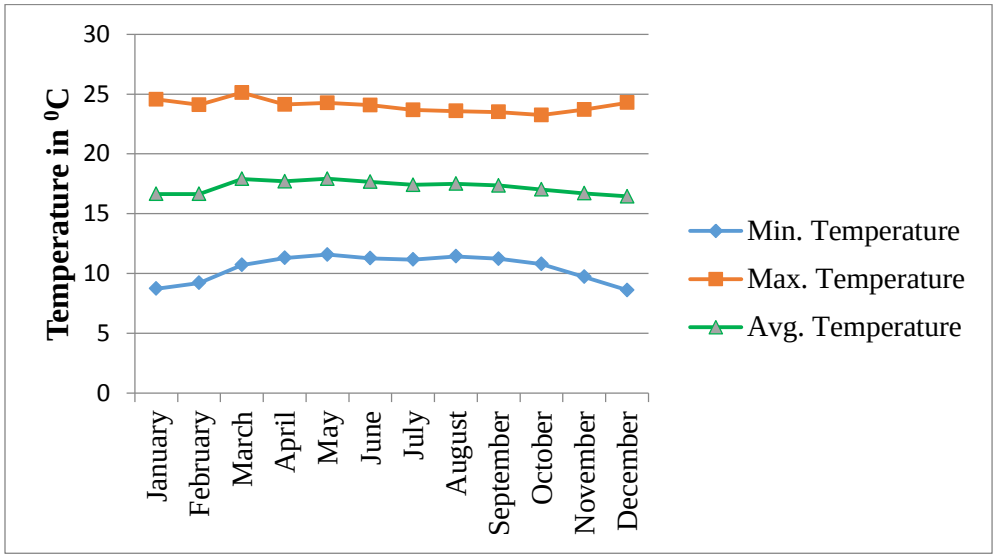

Figure 3.4: Temperature Distribution of Bale Administrative Zone (1999 To 2018)

Regarding rainfall, the highland parts of Bale administrative zone receives abundant and well distributed rainfall both in amount and season, which is conducive for the growth of vegetation and agricultural activities. The administrative zone has two rainfall regimes. These are the long rainy season regime and two rainy season's regimes. The long rainy season extends from March to April with high rainfall during July and August. It covers about 20% of the total area mainly, Agarfa, Gasera, Goba, Sinana and Dinsho *woredas.* The two rainy seasons of rainfall regime are influenced by equatorial westerly and easterly winds which brings rainfall to the zone during spring and autumn seasons. It covers the remaining 80% of the zone mainly, the Southern, Eastern and Southeastern lowland of Rayitu, Sawena, Laga-Hidha, Gurra-Dhamole, Madda-Walabu, Goro, Ginnir, Barbare, Dallo-Menna, Harena-Bulluk Gololcha, Dawe Serer and Dawe-Kachen *woredas*. The mean annual rainfall varies from 200 mm in the extreme lowlands up to 1200 mm in the highlands (BZDFED, 2004). This shows that rainfall increases from Southeast lowlands towards the highlands of the zone found in the north and northwest direction.

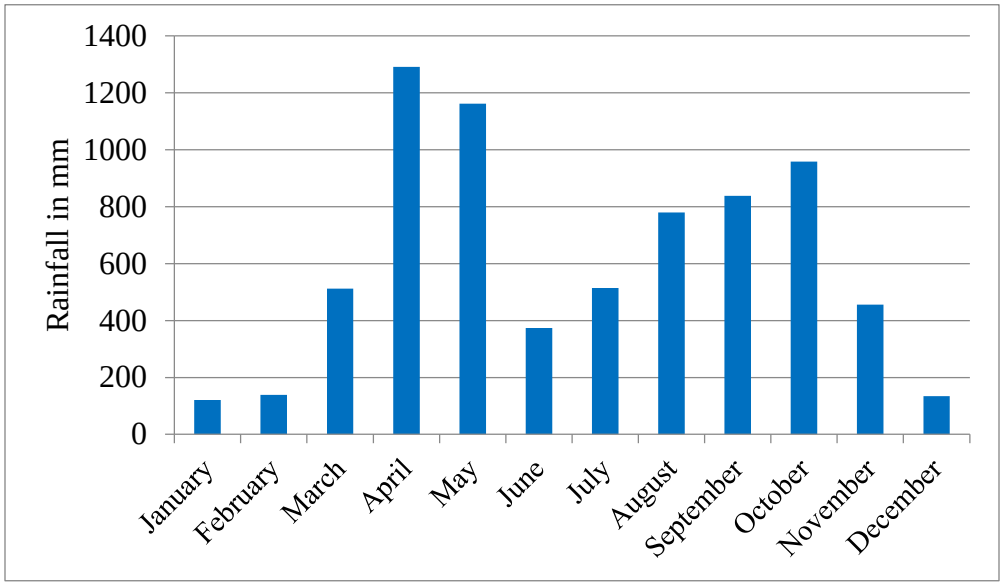

Figure 3.5: Mean Monthly Rainfall of Bale Administrative Zone (2003-2017)

3.2.3 Drainage

The highland of Bale administrative zone is one of the major water shades found in Ethiopia. It is the origin of more than 43 rivers of different sizes. The zone is endowed with numerous rivers and streams. It is estimated that there are about 55 perennial rivers, 18 seasonal rivers and 70 springs in the zone. Generally, the two major drainage basins of Bale zone include the *Gennale*

drainage basin and *Wabe-Shebele*, which respectively, cover 64.3% and 35.7% of the area (Bureau of Finance and Economic Development, 2014).

Gennale River, though not exploited very well, it has wide potential for irrigation. This basin touches all the districts of the zone except Gololcha, Sawena and Laga-Hidha *woredas*. The basin is not developed except the Yadot mini-hydroelectric power station, which is the main source of electric power supply for Menna town. Off course currently, one hydroelectric dam is on construction on this river (Ministry of Water and Energy, 2013).

The *Wabe-shebele* catchment area covers the whole administrative *woredas* of Gololcha, Sawena, Laga-Hidha and parts of Gasera. Currently, it is used as a source of hydro-electric power (*Melka-Wakena* hydro-electric power). Although, it has the potential for irrigation, it is not yet well exploited.

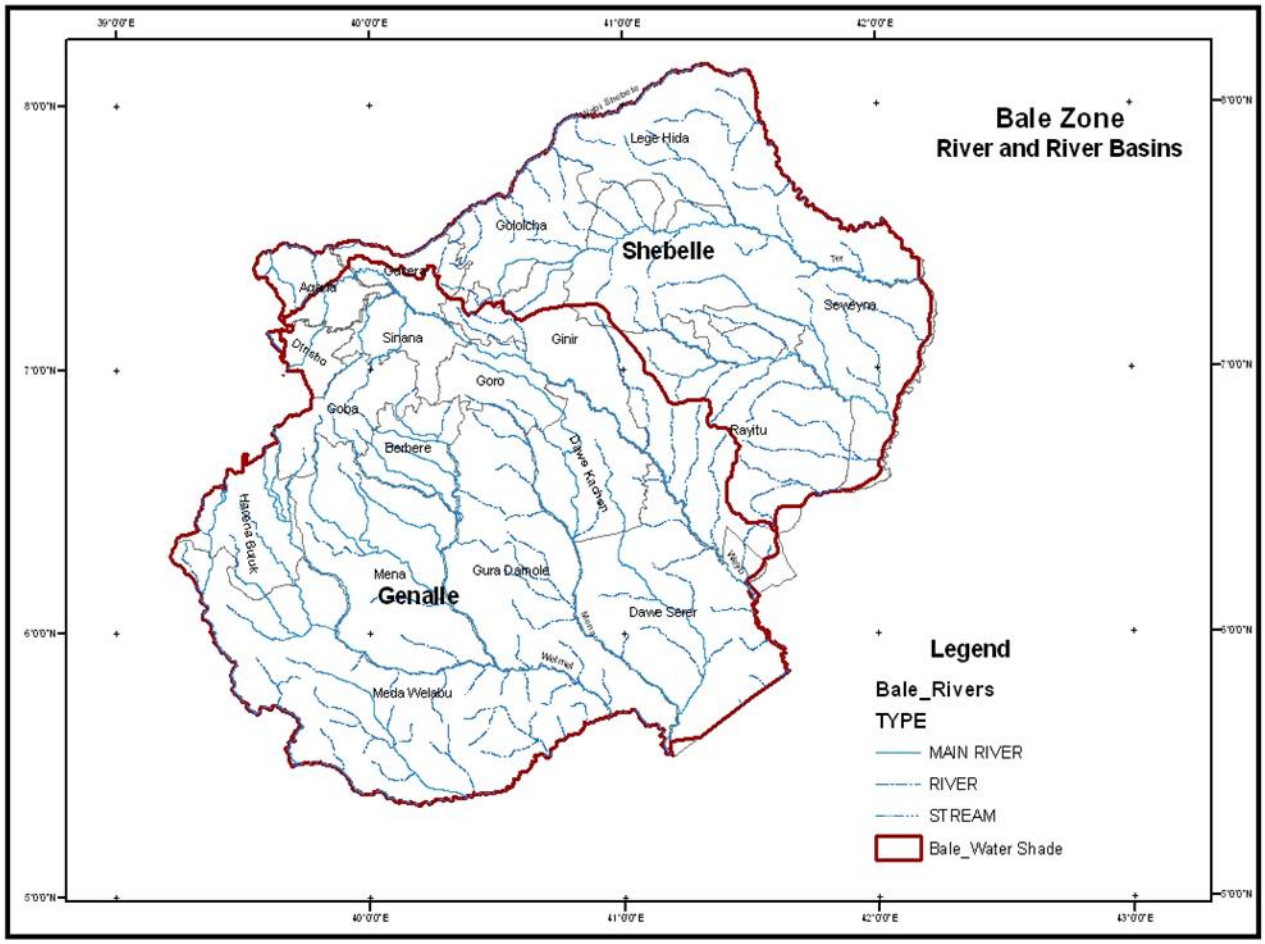

Figure 3.6: Drainage Pattern of Bale Administrative Zone

iv. Soils

According to Bale Zone Department of Finance and Economic Development (2004), about 30 types of soils have been identified in the area.

The major types include:

a. Chromic and Pelvic Vertisoils: they are clay black basaltic soils which mostly developed from tertiary volcanic rocks. These Soils are very fertile and have good agricultural potential. However, they have a limited agricultural use as they shrink and develop deep cracks and become very hard in dry season; and swell and become sticky during the wet seasons. These soils occupy the central highland of Sinana, Dinsho, northern Dello-Menna, Gasera, Gololcha and parts of Ginnir and Goba *woredas* (BZDFED, 2004).

b. Dystric, Chromic, Eutric, Calcic and Vertic Cambisols: these soils were developed from recent lava and linked with sedimentary rocks. Their agricultural values are limited as they mostly found on rugged and steep terrain. Because of this, the soils left for natural plant cover. They cover the lowland of Sawena, Laga-Hidha, Gurra-Dhamole, Madda-Walabu, eastern Ginnir and southern Rayitu *woredas* (BZDFED, 2004).

c. Chromic, Orthic and Vertic Luvisol: these soils are associated with alluvial accumulation of high clay continent. They are dark brown or reddish soils which are suitable for agricultural activities. They are found on the plateau of the central and northwestern highlands of Goba and Agarfa *woredas* (BZDFED, 2004).

d. Dystric and Eutric Nitosol: these soils have good agricultural potential. They are located around flat or gentle slope terrains of northwestern part of Madda-Walabu, western part of Dello-Menna, Harena-Bulluk, eastern part of Sawena, central and southern part of Laga-Hidha, Southern part of Ginnir and north and south extreme parts of Rayitu *woredas* (BZDFED, 2004).

e. Calcaric, Calcic and Halphic Xerosols: these soils are developed under dry condition and therefore, have low agricultural value (poor physical and chemical properties). Calcaric Xerosols are found only in eastern Rayitu; Calcic Xerosols are in western Sawena (bordering Ginnir); Halphic Xerosols are specifically found in the central part of Gurra-Dhamole (BZDFED, 2004).

f. Orthic Solonchak: these soils have high salt continent and usually associated with sedimentary rock formation. Unless they are desalinized, their agricultural value is restricted to grazing. They are located around eastern and central Rayitu and western boarder of Madda-Walabu (along the deep gorge of *Gennale*) (BZDFED, 2004).

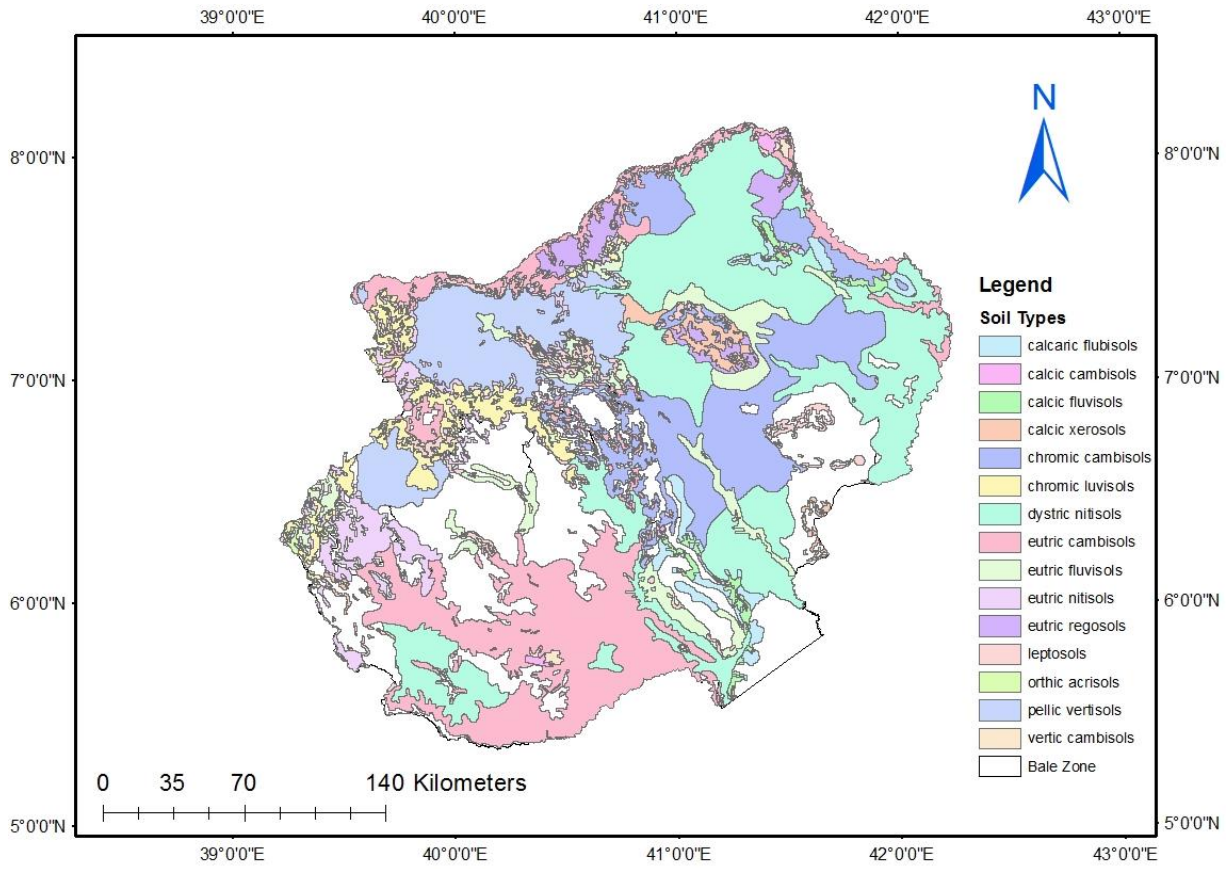

Figure 3.7: Soil Distribution of Bale Administrative Zone

3.2.4 Vegetation

The vegetation cover of the zone is the direct reflection of its climate and soil type. The variation in altitude of the region affects the climate distribution of the zone which further determines the types of vegetation of the area. According to Bale Zone Department of Finance and Economic Development (2004), the common natural vegetation that is found in the administrative zone includes:

a. **Afro and Sub Afro-alpine Vegetation**: found in limited areas of the administrative zone with elevation above 3400 meter and mountain tops. This vegetation type consists of lichens, tussock grass, and scattered giant lobelia. It covers *Sannete* plateaus and surrounding prominent mountain peaks of Goba, Sinana and Dinsho *woredas*.

b. **Coniferous Forest:** it is dominated by Junipers and podocarpous trees with height up to 35 meters. It is found in Harena-Buluk *woreda* of Bale administrative zone.

c. **Junipers Forest**: it is mostly found at altitude ranging from 2300 to 3100 meter with mean annual rainfall of 800-1000mm. It is found in Dello-Menna, Harena-Bulluk, Goba, Barbere and parts of Sinana, Dinsho and Gurra-Dhamole *woredas* of Bale zone.
d. **The podocarpous Forest:** it is found at lower altitude that extends from 1400 to 2200 meter with mean annual rainfall that ranges from 750 to1000mm.
e. **Broad Leafed Forest**: it is found in the most humid parts of the zone with mean annual rain fall of 1000-3400mm and the elevation ranges from 1600 to 3400 meter above mean sea level. It is found in Gololcha *woreda* of Bale zone.
f. **Wood land and Savanna:** it is found within the range of 450 to 2000 meters altitude and with mean annual rainfall ranging from 250 to1000mm. This forest occupies parts of Madda-Walabu, central part of Gurra-Dhamole, Harena-Bulluk, Dello-Menna, Sawena, Rayitu, Laga-Hidha *woredas* and along river bank of *Wabe-Shebele*.
g. **Grass Land:** it is dominated by pastoralist (nomadic and semi-nomadic) activities. It covers extensive areas of Sawena, Goro, Gurra-Dhamole, Madda-Walabu, and parts of Rayitu *woredas* of the zone.
h. **Steppe, Gallery, and Halophytic Vegetation:** it is found in south eastern parts of Rayitu Sawena and Madda-Walabu (along river bank of *Gennale* River) *woredas* of the zone.

Currently, deforestation is one of the major problems in the zone and occurs mainly due to cutting of trees in search of firewood and charcoal making, burning of trees for cultivation and grazing land and cutting of trees for construction materials. Therefore, measures must be taken to discourage the deforestation and awareness has to be created to look for other alternative source of fuel and construction materials.

3.3 Demographic and Socio-Economic Characteristics

According to the census result of 1994, the total population of Bale administrative zone was 1,217,864 with 603,895 males and 613,969 females (CSA, 1994). In the 2007 census, the total population of the zone became 1,418,864 of which 721,679 were males and 697,185 were females (CSA, 2007). The projected population of the zone in 2017 was 1,703,762. Out of these 863,734 were males and 840,028 were females (CSA, 2017).

As to sex composition, the number of males in Bale zone is slightly greater than that of females giving an average sex ratio of 103 (CSA, 2007). In addition, according to CSA (2007) report, the zone has high fertility rate (5.845) which is much greater than the regional (4.845) and national average (4.160).

Census result of 2007 revealed that population of the zone is unevenly distributed. Since most of the population is engaged in agricultural activity, the rural population accounts for 87.5% of the total population of the zone. The urban population accounts for 12.5% which is lower than the national (16%), but like the proportion of urban population of Oromia National Regional State (12.4%) (CSA, 2007).

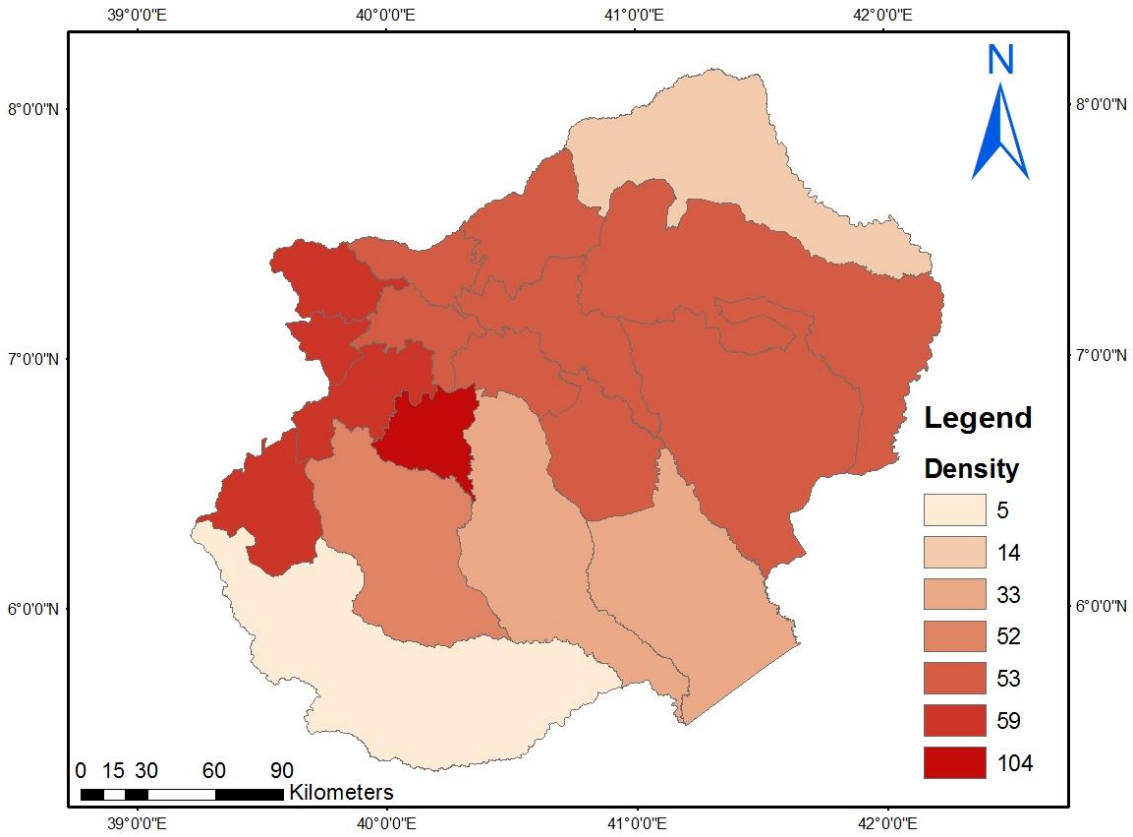

Figure 3.8: Population Density of Bale Administrative Zone by *Woreda* (Person per square kilometer)

Moreover, in Bale, the populations follow different religions. In this regard the 2007 census result indicated that Muslims, Orthodox Christian, Protestant Christian, Catholic and non-

identified religions, respectively, accounted for 76.7%, 19.12%, 1.15%, 2.27% and 0.22% (CSA, 2007).

3.3.1 Economic Base

Agriculture is the back bone economic activity of the population of the administrative zone. It provides means of occupation for large proportion (87.5%) of the population. In the zone, sedentary agriculture is dominantly practiced in the highland (*dega*) and midland (*woinadega*) areas of the zone; whereas livestock rearing (nomadic way of life) is practiced in the lowland and boarder areas of the zone.

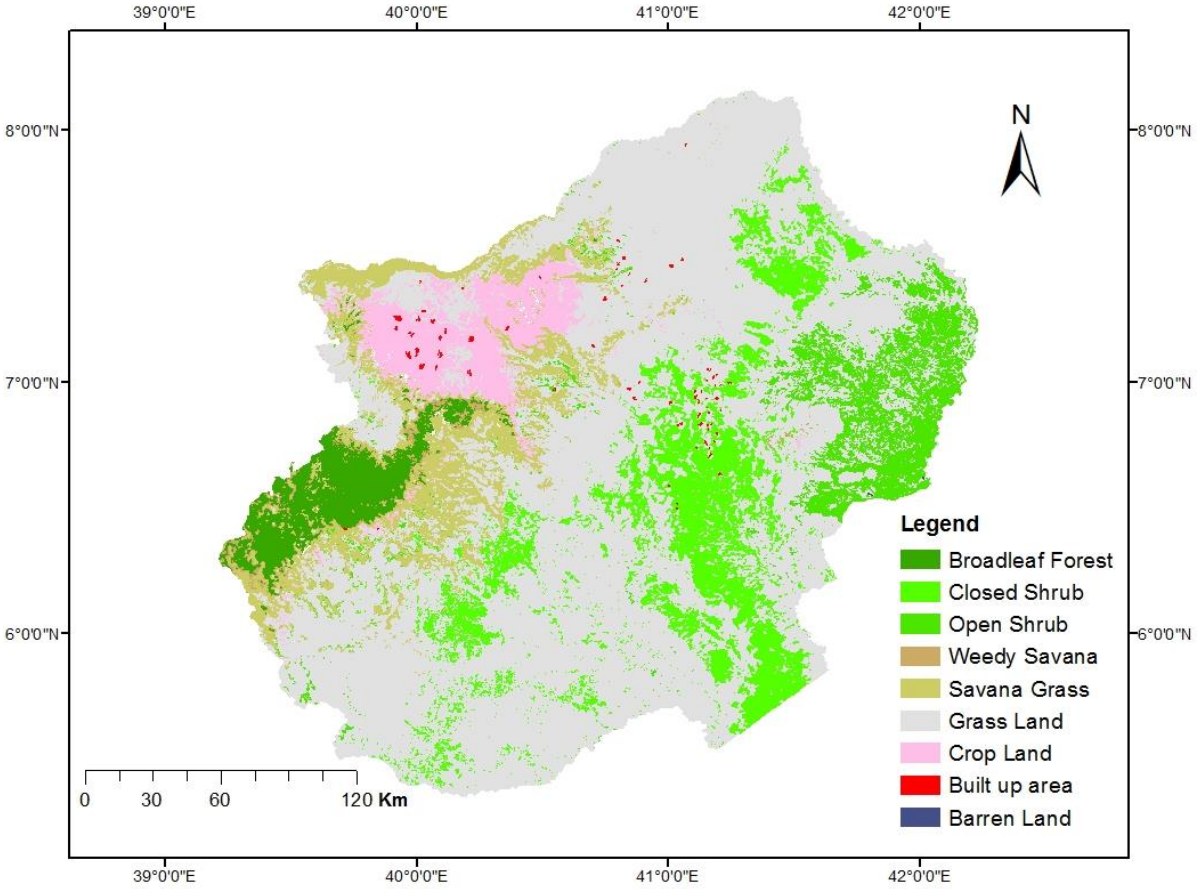

Figure 3.9 Land Use Map of Bale Zone

Table 3.1: Land Use and Land Cover of Bale Zone, 2014

No	Land Use Types	Area in (ha)	Proportion (%)
1	Grazing Land	2,242,184.5	34.6
2	Forests	2,084,956.02	32.1
3	Arable Land	1,009,538.8	15.6
4	Degraded Land	583,308.36	8.99
5	Swampy/Marshy Land	247,738	3.81
6	Others	323,765.36	4.99
	Total Area	6,491,491.04	100

Source: Bale Zone Agriculture and Rural Development Office (BZARDO), 2014

3.3.2 Crop Production

Land is the basic agricultural resource in which the communities depend largely on crop production. In addition, the contribution of labor, capital and input to the agricultural productions were high. Bale zone has two major cropping seasons, which are known as *hageya* or *meher* (autumn) extending from September to November and *ganna* or *belg* (spring) from March to May. *Meher* is the main cropping season for farmers in the zone (especially highlanders); hence the season takes the lion share of production of other seasons as adequate rainfall can be obtained during this season (BZARDO, 2014).

Varieties of crops like cereals, pulses, oilseeds, fruits, vegetables and spices are grown in different *woredas* of the administrative zone. Cereals are the leading in terms of both production quantity and area coverage in both *Meher* and *Belg* seasons, which is followed by pulses and oil seeds. The production of vegetables, root crops and fruits are very limited. In addition, cash crops are produced for market in order to generate money to be used for household purposes. Among the cash crops, the area is well known by producing of coffee. It is grown as forest and garden coffee. It is followed by sugarcane and *chat*[2] (BZARDO, 2014). Such cash crops are dominantly cultivated in the lowlands of the zone.

In general, crop productivity in the zone is characterized by low output. The main reason for this is fragmentation of farm plot due to population increase. The survey data of 2014 shows that

[2] *Chat* is stimulating plant that is chewed in its greenery stage.

about 15% of households have 0.5-1.0 hectares; about 60% of households have 1.5-2.0 hectares, about 20% of households have 2.5-3.0 hectares and about 5% of households have greater than three hectares of farm plots (BZARDO, 2014). Hence, about 75% of the households possessed a plot of land less than two hectares per household. In addition, the socio-economic profile of Oromia region in 2016 indicated that the average land holding size of a household was 1.14 hectares, which is still greater than the national average of 1.01 hectares (Socio-economic Profile of Oromia Region, 2016).

3.3.3 Livestock and Poultry

The administrative zone has very large livestock and poultry resources. From early days, livestock rearing has played an important role in the livelihoods of people in the zone. In the rural lowland areas of the zone, rearing and breading of livestock is the mainstay of the people. Varieties of livestock like cattle, goats, sheep, camels, horses and mules are reared in the zone. Among the different types of livestock in the zone, cattle are the leading in terms of head counts and followed by goats, sheep and horses (BZARDO, 2014). The zone has total livestock possession of 2882753.61in Tropical Livestock Unit (TLU). This gives the per capita 11.56 TLU of the zone. This livestock count of the zone is small in comparison to Borane zone livestock resource, which is 16.78 TLU (Doyo, 2017).

Despite all these, recurrent drought affected the productive potentiality and livestock resource of the area and hence adversely influenced the self-sufficiency of population in the zone. Drought is the result of change in climate, i.e. shortage of rainfall, and land degradation caused by deforestation, over grazing, over cultivation and soil erosion. Thus drought in turn, resulted in decline of water table, loss of soil moisture, failure of crop and loss of pasture, death of human and animals, of biodiversity (BZARDO, 2014). Thus, it calls for designing strategies to build sustainable livelihoods in the zone.

3.3.4 Transportation Infrastructure

Among the broad categories of infrastructure, transport plays a great role in connecting communities of different agro-ecological regions. In this regard, the administrative zone is connected with neighboring zones and region by the national highway that runs through Robe

town to Addis Ababa via Shashemenne or Asella towns and other all-weather gravel roads with Guji and East Hararghe zones.

Currently, in the zone, the only form of transportation which is widely used by the people is road transport and traditional means of transport (pack animals). The availability of motarable road transport is very low as compared to the size of administrative zone, because the construction of road has been slow due to topographic ruggedness of the zone and other factors (Bale Zone Finance and Economic Development Office, 2014).

Table 3.2: Types of Road and their Length in Bale Administrative Zone

No	Types of Road	Length in Km
1	Asphalt	45
2	Gravel	147
3	Rural Gravel	772.72
4	All Weather Road	1584.45
5	Dry Weather Road	-
	Total	2,549.17

Source: Bale Zone Finance and Economic Development Office, 2014

As the data in Table 3.2 indicates, all *woreda* capitals of the zone relate to zonal capital, Robe town. The zone has a total of 2549.17 kilometer roads, out of which 919.72 (38%) are gravel roads and, 1584.45 (63%) are all weather roads with no primary road (asphalt). This road network is expected to facilitate interaction of rural-rural, rural-urban and urban areas in the administrative zone. However, the gross road density (40km/1000km^2) was found to be low in comparison to the national standard, which is 42.6km/1000km2 (ERA, 2009).

3.4 Historical Background of Bale Administrative Zone

The name Bale is spelled in different sources as Bali, Baalee and Baallii, but there is no difference in location and historical reference to the current Bale. However, the Oromos of the area firmly emphasize that the name Bali has been adapted from the Oromo word *Baallii*, which is to mean feather of rare birds like Ostrich (Kefyalew et al., 2014). This was used as symbol of

authority and bravery, which was transferred from the ruling assembly at the end of their term to the newly empowered group. Likewise, people in Bale, particularly refer the central highland plateau of Bale as "Bale proper". People in the lowland use to say *"Warra Baalee"* to those who are from the highland, present day *woredas* of Sinana, Goba, Gasera, Goro, Dinsho, Agarfa and parts of Gololcha and Ginnir (Bale Zone Administration, 2013). However, the legal administrative boundary of Bale includes the 18 *woredas* and two towns of the highlands and lowlands.

Formerly, based on the 1955 constitution's territorial reorganization of the Ethiopian empire, Bale was one of the fourteen governorate generals (Bale Zone Administration, 2013). Before this, it was one of the administrative *Awrajas*[3] of Hararghe provinces. Later on, the central government's house of deputy decided Bale to become and attain the status of province in 1952. Then after, it used to have five *woredas* namely: Wabe, Elkere, Dello-Menna, Mandoyu (Fasil) and Gennale. However, the formation of Bale divided into five *woredas* was not easy as expected for administration and tax collection purposes as it had vast territory. At that time, it had a total area of 124,600 square kilometers. Due to this, it was divided into the autonomous regions of Ogaden and the province of "Bale proper". In the meantime, the former five *woredas* were promoted to *Awraja* level, which then divided into twenty-five *woredas* that formed the "Bale proper" (Ketema, 2002). The five *Awrajas* were Mandoyu *Awraja* which includes Sinana, Goba, Agrafa, Dinsho, Goro, Gasera *woredas*; Elkere *Awraja* which includes Eme, Barre, Dalo-Bay, Afkere, Serer *woredas*; Wabe *Awraja* which includes Rayitu, Sawena, Beltu, Gololcha, Ginnir *woredas*; Dello-Menna *Awraja* which includes Menna, Harena, Barbere, Madda-Walabu, Gurra-Dhamole *woredas*; and Gennale *Awraja* which includes Adaba, Dodola, Kokosa and Nansebo *woredas* (Ketama, 2002).

Later, the *Dergue* regime reorganized Bale with 13 *woredas* namely Madda-Walabu, Menna, Mandoyu, Gannale, Wabe, Rayitu, Sawena, Goro, Gura-Dhamole, Agarfa, Gololcha, Barbere, and Beltu, which lasted from 1989 to 1991 (Bale Zone Finance and Economic Development Office, 2014).

[3] Awraja was an administrative unit next lowers to a province, which may roughly equivalent to existing administrative zone.

After the downfall of the *Dergue* in 1991, the new federal structure merged El-Kere *Awraja* with the Ethiopian Somali National Regional State and Bale zone was restructured into seventeen *woredas*, which comprised almost all the previous *Awrajas* of Gannale, Wabe, Mandoyu and Menna and their *woredas*. The total area of the Bale administrative zone at the time was 71,208 square kilometers (Solomon, 2005; Ketema, 2002). Bale attained its present size of 63,555 square kilometers after its Northwestern *woredas* of Adaba, Dodola, Werka and Kokosa were detached and merged with other *woredas* to form west Arsi administrative zone in 2006. Thus, its area was reduced further, off course twice, in the current governmental structure in 1991 and 2006 (Solomon, 2005).

3.5 Description of the Sampled Study Sites

The physical and historical background of Bale zone revealed that the current administrative *woredas* of the zone are categorized into highland and lowland *woredas*. Since the main purpose of this study is to examine the linkage between these two agro-ecological regions, sample *woredas* were drawn from both agro-ecological regions. In this sub-section, the physical and historical contexts of the sampled *woredas* (two from each agro-ecological region) have been described below.

3.5.1 Sampled Highland *Woredas*

As indicated in the preceding discussions, about 31% of the land surface of Bale zone is categorized as highland, with elevation of 1500 meter above sea level. Those administrative *woredas* positioned in this land mass are considered as highland *woredas*. Accordingly, eight *woredas* namely: Gololcha, Gasera, Goba, Sinana, Dinsho, Goro, Agarfa and parts of Ginnir are identified as highland *woredas*. The two highland *woredas* selected as sample in this study were Goba and Gololcha.

3.5.1.1 Goba woreda

3.5.1.1.1 Physical Characteristics

Goba is one of the administrative *woredas* of Bale zone with an area of 1674 square kilometer is situated at 6° 34’48” to 7° 2’30’’ North and 39° 40’52 to 39° 53’55’’ East. It is situated at a distance of 15 kilometers from the zonal administration capital, Robe and 445 kilometers from seat of the Federal State of Ethiopia, Addis Ababa (BZFEDO, 2014). In its relative location, the

woreda is found south of Sinana and Dinsho *woredas*, north of Dello-Menna *woreda*, east of Adaba *woreda* and west of Goro and Barbere *woredas*. See Figure 3.1

The geographical setting of the *woreda* is categorized as highland. The topographical elevation progressively increases south ward until it reaches climax at *Sannete* plateau that rises to about 4377 meter above sea level at Mt. *Dimtu (Tullu-Dimtu).* The terrain characteristics of the *woreda* include plain (45%), steep slope and rugged terrain (37%) and mountainous topography (18%). Thus, almost all of the landmass is categorized as highland ecology.

Regarding drainage, *Shaya* and *Tegona* that originate from hills and plateau of the *Sannete*, are the two perennial rivers that flow north ward and join *Weyib* River which finally drain into *Gennale* River.

Climatically, highland climate dominates the *woreda*. The climate of the area is highly determined by altitude. About 78% of the region is found in the temperate (*dega*) agro-climatic zone. Frost (*wurch*) and subtropical (*woinadega*) agro-climatic zones share 10% each. The remaining 2% is categorized as tropical (*kola*) agro-climatic zone (Goba *Woreda* Agriculture and Rural Development Office, 2004). The mean annual temperature of the *woreda* ranges from 5^0 to 18^0c. The rainfall is bimodal. Heavy rainfall comes during summer season and moderate rainfall comes during spring season. Average total annual rainfall is 1300 mm.

3.5.1.1.2 Socio-economic characteristics

According to the 2007 census result, the total population of Goba *woreda* was 40,757 of which 50.6% were men and 49.4% were women; none of its population was urban dwellers. Most of the inhabitants were Muslim, with 76.89%, while the remaining 22.89% of them practiced Ethiopian Orthodox Christianity (CSA, 2007).

Agriculture is the major livelihood of the *woreda's* population. In the *woreda*, sedentary agriculture is dominantly practiced in the highland areas. Due to availability of suitable grazing land for animals, livestock rearing is also productive.

Cereals (wheat, barley and oats) and pulses (bean, peas and lentils) are the major food crops produced. Summer and spring are main production season in which spring is the major one (Goba *Woreda* Agriculture and Rural Development Office, 2004).

In the *woreda*, land holding is unevenly distributed among households. The average farmland size is 3.2 hectare per household. They still plough their land using oxen and with the aid of hoes. Some households even do not have oxen (Goba *Woreda* Agriculture and Rural Development Office, 2004).

Productivity of livestock is better compared to other *woredas* of the administrative zone due to sufficient grazing land. The major livestock feed includes natural grass, crop resides, hay, improved forage plants and industrial bi-products. Average pasture land size per household ranges 0.5 to 1 hectare and there is wide area of communal grazing land in the *woreda* (Goba *Woreda* Agriculture and Rural Development Office, 2004).

Road transportation is the major means of transport in the *woreda*. The total length of motarable road in the *woreda* is about 95 kilometers of which 14 kilometers are gravel. All weather roads are about 80 kilometer long. The all-weather rural road connects the *woreda* with the neighboring lowland *woreda* of Dallo-Menna. However, the quality of this road is very poor, which needs continuous maintenance. The road passes through the highly elevated ground of *Sannete* massive, group of mountains. It passes over an altitude greater than 3500 meters above sea level. For that matter there is no dry weather road within the *woreda* that connects the rural administrative *kebeles*. But recently an attempt was made to construct dry weather roads that connect Goba town with the nearby rural administrative *kebeles* of *Sinja-wacho* (5km) and *Wacho-Bokko* (5km).

Rira is one of the sampled rural administrative *kebeles* of Goba *woreda*. The livelihood strategies of communities in the area partly associated with the forest where the youth keep beehives. These areas are also known for cabbage production in a large amount and as a result, there are many peoples who are engaged in selling local variety cabbage.

3.5.1.2 Gololcha Woreda

3.5.1.2.1 Physical Characteristics

Geographically, Gololcha *woreda* lies between 7^0N to 7.5^0N latitude and 4^0E to 4.5^0 E longitudes. In its relative location, it is bordered by Seru *woredas* of Arsi zone in the north, by Ginnir *woreda* in the south, Gasera *woreda* in the west, Lega-Hidha and Sawenna *woredas* in the east. The *woreda* is found at a distance of 117 and 547 kilometer from zonal capital Robe and national capital Addis Ababa, respectively. The total area of the *woreda* is 2,176 square kilometers (Oromia Bureau of Finance and Economic Development, 2006).

According to the information obtained from Gololcha *Woreda* Agriculture and Rural Development Office (2003) part of the *woreda* is characterized by rugged terrain, which extends from the very western border of the *woreda* up to the foot of Mt. *Arab-Lij* east of *Sof–umar* cave (*Sa'ada*). The central and southern portion of the *woreda* is characterized by generally slopping plain. Regarding the distribution of relief configuration, about 40% is plain, 54% is rugged terrain, 2.5% is valleys (Gorges), 3% is mountainous and 0.5% includes others. Hence, about 60% of the land mass in the *woreda* is categorized as highland. The lowest elevation is 1200 meter above sea level, found along the *Wabe-Shable* river course. While the highest peak is mount *Arab-Lij* (2660m) located in the southeastern portion of the *woreda*. Mt. *Kubayou* (2390m) is the other significant peak in the *woreda* (Gololcha *Woreda* Agriculture and Rural Development Office, 2003).

The rivers of the *woreda* drain into *Wabe-Shebele* river basin. The major tributaries of the river in the *woreda* are *Gololcha* and *Dhare* together with small intermittent seasonal streams like *Hammara*, *Ameja*, *Kershe*, *Ichible* and *Gotu* that terminate during dry season. There are also several springs that originated from the foothills of the *woreda*. These springs are the major sources of potable water (Gololcha *Woreda* Agriculture and Rural Development Office, 2003).

The mean annual temperature of the *woreda* is 19^0c with maximum and minimum annual temperatures of 23^0c and 15^0c, respectively. The mean total annual rainfall is about 750 mm which ranges from 630 mm in the *kola* zone to 920 mm in the *dega* agro-climatic zone. Based on altitude, the *woreda* is classified into three ago-climatic zones namely temperate, subtropical and

tropical that covers about 16%, 49% and 35%, respectively (Gololcha *Woreda* Agriculture and Rural Development Office, 2003).

Table 3.3: Agro-Climatic Zones of Gololcha *Woreda*

Agro-climatic Zone	Area coverage in Percentage
Temperate (*Dega*)	16
Sub-tropical (*Woina-dega*)	49
Tropical (*Kola*)	35

Source: Gololcha *Woreda* Office of Agriculture and Rural Development, 2003

The agro-climatic zones shown in Table 3.3 depicts that the *woreda* is characterized by a great diversity of temperature because of its wide range of altitudinal extent. In the northern part of lowland area, along *Wabe-shebele* River, the area experiences tropical temperature. This ago-ecological zone covers 35% of the total area of the *woreda*. Sub-tropical temperature areas of the *woreda* are found in all part of the area except in the northern part of the *woreda*. These agro-ecological zones cover 49% of the total areas of the *woreda*. Highland or temperate areas are found in the central part of the *woreda*.

According to the *woreda's* office of rural development and agriculture office, the areal extent and major varieties of natural vegetation of the *woreda* has the following picture.

Table 3.4: Natural Vegetation Types of the *Woreda*

No	Vegetation type	Proportions of vegetation types (%)
1	High forest	48.6
2	Riverine	-
3	Shrubs and Bushes	51.4
Total		100

Source: Gololcha *Woreda* Agriculture and Rural Development Office, 2003

The *woreda* is endowed with both natural and man-made forests. The protected man-made forest covers about 680 hectares owned by private, community and co-operatives. There is also one

state forest known as *Kubayou forest*, which covered about 79,000 hectares in 1979, but currently, its coverage reduced to about 29,734 hectare due to expansion of agriculture land and clearance of wood for construction and firewood purposes (Gololcha *Woreda* Agriculture and Rural Development Office, 2003).

3.5.1.2.2 Socio-economic Condition

Based on the 2007 housing and population census result, the population of the *woreda* was 100,809 out of which 50.5% were males and 49.5% were females. Regarding settlement distribution, 94.25% of the population lives in rural areas; and the remaining 5.75% of them are urban residents. Regarding ethnic and religious distribution, most of the inhabitants (94%) of the *woreda* are Oromos. Few inhabitants, about 6%, are from other Nations and Nationalities. Islam and Christianity are the two dominant religions in the *woreda*, which respectively, account for 73.95% and 26 % in terms of followers (CSA, 2007).

In Gololcha *woreda*, sedentary agriculture is dominantly practiced in the highland and midland areas, where as livestock rearing is common in the border areas of the *woreda*. A hospitable climatic condition encourages crop production of different varieties in the *woreda*. Cereals are the leading crop type in the *woreda*. Among these wheat, barley, oats and *teff* are extensively produced crop types. Pulses, oil seeds and red-pepper are also produced in a significant amount. Besides, coffee, *chat* and different fruits are also cultivated in small amount (Gololcha *Woreda* Agriculture and Rural Development Office, 2003). Autumn and spring are the major production seasons of the *woreda*. The main rainy seasons cover about 60% of the *woreda's* production.

Average land holding size is 2.5 hectare per household. As it is common in the other *woredas* of the administrative zone, land fragmentation is problem in the *woreda*. On average households have two plots of land separately.

Livestock rearing is also widely practiced in the *woreda*. Concerning their distribution, cattle are the most abundant and attain first rank even from number of chicken poultry in the *woreda*. Concentration of cattle increases from lowland areas to highland region and relatively small in semi- lowland region of the *woreda*. On average households have 8 cattle, 7 sheep and 6 goats in the *woreda*. Camels are the least in size (Gololcha *Woreda* Agriculture and Rural Development Office, 2003).

There is all-weather rural road of 150km long that runs from Robe to Jarra town (capital of Gololcha *woreda*). Within the *woreda* there are roads that connect Jarra town with the surrounding hinterlands. These include Jarra to *Dirre-sheik-Hussein* (78km), Jarra to Bulbula (15km), Jarra to Bereket (3km), Jarra to Buriya (50km), Jarra to Hidila (25km) (Gololcha *Woreda* Transport Office, 2003).

Dirre-sheik-Hussien is a historical place where pilgrims of over 100,000 worship in a year. Pilgrims come from every corner of the country. Some source indicated that distant pilgrims come from countries like Iraq and Yemen. The dances and Hymns particularly depict typical African culture. It is very fascinating to be in *Dirre sheik-Hussien* during times of *Haji*[4] and *Zahara*[5] in the corresponding moths of January, February and October (Gololcha *Woreda* Culture and Tourism Office, 2003).

Buriya is one of the rural administrative *kebeles* of Gololcha *woreda* which was selected as sample study site.

3.5.2 Sampled Lowland *Woredas*

In this study two lowland *woredas* were selected purposely to examine their linkage with the adjacent highland *woredas*. These two lowland *woredas* are Sawena and Dello-Menna. Thus, to get an insight to their links with the neighboring highland *woredas* discussed above, their physical and socio-economic characteristics are presented briefly.

3.5.2.1 Sawena Woreda

3.5.2.1.1 Physical Characteristics

Astronomically, the woreda is situated at 6° 32'39' to7° 37'58' North and 39° 51'58'' to 42° 40'00'' east. In its relative location, Sawena *woreda* is bounded by Legal-Hida *woreda* in the north, Rayitu *woreda* in the south, Somali regional state in the east and Ginnir *woreda* in the west. The capital town is Micha, located at 200 and 630 kilometers from Robe town, the capital of the administrative zone and the national capital Addis Ababa, respectively. Sawena is the

[4] *Haji* is pilgrimage time to *Dirre sheik-Hussien* that coincides with the pilgrimage to Mecca (Ostebo, 2012)
[5] *Zahara* is the second pilgrimage time to *Dirre sheik-Hussien* that takes place in the month of October (Ostebo, 2012).

largest *woreda* in the zone with a total area of 8289 square kilometer. It is recently divided into 19 rural kebele administrations (Oromia Bureau of Finance and Economic Development, 2006).

Agriculture is the main occupation of the community of the *woreda* and accounts for more than 90% of their livelihoods. Out of the total agriculture dependent population, more than 60% of them are nomads (Oromia Bureau of Finance and Economic Development, 2006).

The land configuration in the *woreda* shows rise in elevation from east to west reaching its climax at about 1550 meter above sea level at the boarder of Ginnir. The lowest point is about 450 meter above sea level, which is found along *wabe-shebele* river course in the eastern lowland (Oromia Bureau of Finance and Economic Development, 2006). The land configuration of the *woreda* is classified into the western plain land and the Eastern lowland. The western plain lands which approximately cover about 30-40% of the *woreda*, has an elevation of nearly 1000 meter. The eastern lowland covers the remaining 60-70% of the land mass in the *woreda*. It covers the eastern low standing escarpments along the rugged terrain of *Wabe-Shebele* River (Oromia Bureau of Finance and Economic Development, 2006).

All surface runoff of the *woreda* drains to *Wabe-Shebele* basin, which drains most of Arsi, east and west Hararghe zones, Bale and large portion of regional states of Somali. The major rivers found in the *woreda* include *Mekennisa*, *Dare*, *Manduba*, *Kurkura*, Dike and *Kajama*. Most of these rivers are seasonal and small, which dry during winter season.

Although agro-ecologically, the *woreda* is characterized by hot climatic region, in the eastern lowland along *Wabe-Shebele* river basin, there are areas that can be regarded as desert. In the western periphery of the *woreda*, where it is bounded by *Ginnir woreda*, there are areas regarded as semi-highland. This agro-ecological region accounts for 4.72%. The others like tropical and arid accounts for 92.27% and 3.2%, respectively. Concerning temperature, the mean annual temperature is about 23^0C, while mean total annual rainfall is below 300 mm (Oromia Bureau of Finance and Economic Development, 2006).

Unlike the adjacent *woreda* of Gololcha and Rayitu, Sawena is devoid of dense forest, grasslands, junipers, acacia, savanna and woodlands are dominant vegetation type in the *woreda*. The grassland of south and southeast, unlike most of western grasslands, they are highly resistant to fire. The woodland and savanna region extend in elevation from 400 to 850 meter above sea

level with mean annual rainfall varying from 250 to 800 mm (Oromia Bureau of Finance and Economic Development, 2006). This area consists of three types of woodland and savanna vegetation. These are mixed deciduous woodland, various types of acacia woodland and savanna.

3.5.2.1.2 Socio-Economic Condition

Based on the 2007 census result, the total population of Sawena *woreda* was 65,846. Out of this 50.1% were males while the remaining 49.9% were females (CSA, 2007). Concerning their settlement distribution, 94.27% of them live in rural areas, while 5.73% of them are urban residents (CSA, 2007). 97.6% of them are followers of Islam. The remaining 2.1% are followers of Christianity. Average household size in the *woreda* was six children per a family. The total population density of the *woreda* was estimated to be 5.5 persons per km^2.

Most of the land in the *woreda* is left for grazing and others are covered by shrubs and short woodlands. Proportion of land covered by crops was very small. Maize, sorghum, wheat and *teff* are major crops cultivated in the *woreda*. Spring and autumn are the two major growing seasons of which 90% of the production was coming during spring season (Oromia Bureau of Finance and Economic Development, 2006).

The overwhelming proportions of population in the *woreda* were engaged in livestock rearing; hence there is large number of livestock population in the *woreda*. According to agricultural office of the *woreda*, there are about 47,012 cattle, 25,155 goats, 4037 sheep, 3735 donkeys and 12,999 camels (Oromia Bureau of Finance and Economic Development, 2006). Poultry and beehives are limited.

Sawena is one of the remotest *woreda* with poor road network development that connects the *woreda* with other *woredas* of the administrative zone. The only road which passes through Micha, capital of Sewena *woreda* to Laga-Hidha, is all-weather road. Mandera is the sampled rural administrative *kebeles* of Sawena *woreda*. The *kebele* is supposed to represent the lowland agro-ecology.

3.5.2.2 Dello-Menna Woreda

3.5.2.2.1 Physical Characteristics

Dello-Menna is one of the administrative *woredas* in the Bale zone of Oromia Regional State. It was part of former Menna and Harenna-Bulluk *woreda* that was separated as Dello-Menna and Harenna-Bulluk *woreda* in the mid of 2006. In its relative location, Dello-Menna is bordered in the south by Madda-Walabu, in the west by Nensebo, in the north by Goba, in the northeast by Barbere, and in the east by Gurra-Dhamole *woredas*. The total area of the *woreda* is about 4834 square kilometers (Oromia Bureau of Finance and Economic Development, 2006). It is situated at 5° 48'31'' to 6° 37'20''North and 39° 56'00'' to 40° 30'00'' East at a distance of 125 kilometers from zonal capital of Robe town and 555 kilometer from the national capital, Addis Ababa city.

Topographically, most of the landmass of the *woreda* is situated at altitude less than 1500 meters above sea level. The highest point is Mt. *Orbo* with an elevation of 3500 meters above sea level, which is found adjacent to *Sannate* plateau, while the lowest point is Dumal river basin with an altitude of 800 meter above sea level that is found along the border of Gurra-Dhamole *Woreda* (Oromia Bureau of Finance and Economic Development, 2006).

Concerning the relief distribution of the *woreda* 59.5% is plain land, 22.5% is rugged terrain, and 18% is gorge, hills and mountains. Thus, about 60% of the landmass is categorized as lowland (Oromia Bureau of Finance and Economic Development, 2006).

Regarding climate, the mean annual temperature of the *woreda* is 29.5^0C. The lowest and highest temperature is 21^0C and 38^0C, respectively. The mean total annual rainfall is 701.5 mm, whereas the lowest and highest rainfall is 628 mm and 775 mm, respectively. The *woreda* has two types of rainfall regimes. The first regime is characterized by one long rainy season that extends from March to Augusts. But months with the highest rainfall concentration are June, July, and Augusts. This type of rainfall covers all part of the *woreda* except small parts of the margin of southeast part of the *woreda* (Oromia Bureau of Finance and Economic Development, 2006).

Concerning the drainage system, *Welmel*, *Yadot* and *Shawe* are the main tributaries which drain into *Gennale* river basin system. Besides, there are numerous springs like *Utalcha Kumbi*, *Laga Abdi* and *Burkitu Darera*.

Regarding vegetation distribution, the *woreda* has forest resource that covers about 90,000 hectares of land (Oromia Bureau of Finance and Economic Development, 2006). The forested area is very important for grazing in providing respite for livestock during the dry season.

3.5.2.2.2 Socio-economic Activities

According to the 2007 census result, the total population of Dello-Menna *woreda* was 89,670. Out of this 50.8% were males, while the remaining 49.2% of them were females. The overwhelming majority (88.1%) of the population were rural residents. The remaining 11.9 percent were urban residents. Religion wise, the majority (92.59%) of the inhabitants were Muslims, while 6.63% of the population practiced Christianity. The two largest ethnic groups reported in Dello-Menna are Oromo (93%), and the Amhara (5.4%); all other ethnic groups made up 1.51% of the population (CSA, 2007).

In rural areas of the *woreda,* temporary and scattered rural settlements are the common settlement. Temporary rural settlement is inhabited by nomadic peoples of lowland and boarder areas of the *woreda* along *Gennale* gorges. This settlement takes place due to harsh climatic condition forcing peoples to live in these areas; to move seasonally from one area to other with their herds for the search of pasture land.

In the *woreda*, both cultivation and livestock rearing are practiced. Crops like; cereals, pulses, oilseeds, fruits, vegetables and spices are produced in the *woreda*. Coffee is also an important cash crop. Over 5000 hectares of land are covered by coffee plantation (Dallo-Menna *Woreda* Pastoralist Office, 2008).

In addition, the *woreda* has a very large livestock and poultry resource. From early days, livestock rearing has played an important role in the livelihoods of the *woreda's* population. In the rural lowland areas of the *woreda*, livestock rearing, and breading is the main livelihood of the people. The 2007 livestock survey result found that in the *woreda* there are 161,993 cattle,

49,770 shoats, 14,275 equines, and 23,690 camels (Dello-Menna *Woreda* Pastoralist Office, 2008).

A survey of land use categories in the *woreda* shows that 9.8% of the land is arable or cultivable, 29.3% is pasture, 56.5% forest or other heavy vegetation, and the remaining 4.1% is considered as swampy, degraded or otherwise unusable (Dello-Menna *Woreda* Pastoralist Office, 2008).

Currently, in Dallo-Menna, the only form of transport, which widely used by the peoples are road transport and traditional means of transport (pack animals and human head portage). But the availability of road transport is very low as compared to the size of the *woreda* because the construction of road has been slow down due to rugged topography.

Chirri is the sampled rural administrative *kebeles* in Dello-Menna *woreda*. The *kebele* considered to represents as sample of the lowland agro-ecology, destination for youth migrants mostly from Shewa administrative zones.

3.6 Conclusion

From the descriptions made so far regarding the physical, demographic and socio-economic characteristics of the study area, it can be concluded that the two *woredas* from the highlands likely share some common characteristics. On the other hand, the agricultural production of the highland and lowland *woredas* greatly varies. This may have an implication on development of regional complimentary and integration, the necessity of linking communities of the two ecological regions. The sampled rural *kebele* administrations (RKAs) were found both in the highland and lowland ago-ecological regions. The major criterion to classify them in the two agro-ecologies is elevation above sea level. In this regard, the two RKAs taken from the highland agro-ecology were Rira and Buria, situated at 2904 and 1976 meter above sea level, respectively. The other two taken from the lowland agro-ecology were Chirri and Mandera located at an altitude of 1435 and 1361meter above sea level, respectively. See Figure 3.2

Some of the physical variables that are responsible for variation in the agricultural productivity are indicated below.

Table 3.5: Physical Characteristics of the Sampled Highland and Lowland *Woredas*

Physical characteristics	Sampled *Woredas*	
	Highland	Lowland
Average Area	1925km^2	6561km^2
Average Temperature	15.25°C	26.26°C
Average Rainfall	1025mm	500.75mm
Average Landholdings	2.85ha/hh	-

Source: CSA, 2007

On the other hand, the demographic and socio-economic characteristics show that there is homogeneity in the ethnic group and religion followed.

Table 3.6: Demographic and Socio-Economic Characteristics of the Sampled Highland and Lowland *Woredas*

Demographic Characteristics		Sampled *Woredas*	
		Highland	Lowland
Population Size		182,591	155,516
Religion: (%)	Muslims	75.42	95.10
	Christians	24.44	4.65
Ethnicity: (%)	Oromo	93	94
	Others	7	6
Population Density		94.85 p/km^2	23.7p/km^2
Sex ratio		102.1	101.8
Dependency ratio		113.08/100	120.9/100

Source: CSA, 2007 and Own Calculation, 2017

As can be seen from Table 3.6, the dominant ethnic group in the sampled highland and lowland *woredas* is Oromo, followed by other ethnic groups like Amhara and Somali. This implies that there is internal and external homogeneity in terms of ethnicity between the highland and lowland communities. This may have also some implication on the magnitude of social linkage between the two communities.

In terms of population density, the highlands are densely populated than the lowlands. This is attributed to the availability of promising climate, fertile soils, dense vegetation and water in the highlands. The sex ratio of the sampled respondents indicated that the numbers of male and female populations is relatively balanced. But the gender ratio of the highlanders is slightly higher than the lowlanders. This implies that higher numbers of males are residing in the highlands to the lowlands. On the other hand, the dependency ratio is found to be higher in the study sites. This implies that there are larger numbers of population below age 15 and above 64. The ratio is relatively higher in the lowlands to the highlands, implying that there are large dependent populations in the lowlands of the administrative zone.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Research Paradigms

The purpose of research is to let us know about the world. Undoubtedly, that is a significant role of research, but a little more thought reveals that there are other aspects to this question that deserve consideration and that can dramatically affect how research questions are chosen and operationalized (Gomez and Jones, 2010).

In geographical research, one of the concerns revolves around the issue is, whether research is designed to look for spatial patterns of phenomena, or whether it is designed to understand matters of causality. This distinction directs back to the philosophical question of whether it is possible to claim that a particular action caused another. This implies that geographers influenced by positivist epistemology might contend that research to find causal relationships involves looking for spatial regularities phenomena, those influenced by realism focus on processes and structures rather than on outcomes and patterns (Gomez and Jones, 2010). Moreover, proponents of positivism claim objective view of truth or reality. On the other hand, post positivists like constructionist claim the construction and re-construction of reality. It is commonly known among social geographers.

Therefore, in this study, the pragmatism epistemology has been pursued. This is mainly because combining both methods (positivism and interpretivism) aims to attain the broadest and precise demonstration of the reality. Besides, the aim of this study is to explore linkages between settlements of the highland and lowland ecologies and to examine the underlying effects on their livelihoods in detail. Hence, pragmatism, which emphasizes on both objectivist and subjectivist approach to studying phenomena, gives importance to this research method.

4.2 Research Approach and Design

In this study mixed research approach was employed. This is because the use of mixed approach provided a complete understanding of the research problem rather than either one of the two approaches alone could (Tashakkon and Taddlie, 1998; Johnson, 2004). Among the

mixed approaches, the concurrent triangulation strategy was employed. This approach enables to collect quantitative and qualitative data simultaneously during a single data collection phase (Creswell, 2003). Moreover, it provides a study with the advantage of both quantitative and qualitative data. Furthermore, it enables confirmation and cross-validation of findings obtained from quantitative and qualitative methods as integration was made during data interpretation (Creswell, 2003).

Hence, quantitative and qualitative data were collected at a time with the help of close-ended and open-ended questions. The quantitative survey research enables to draw representative and unbiased samples from the study population and helps to describe the existing conditions of linkages between the two agro-ecological regions. Moreover, it helps to analyze the relationship between different variables collected from the sampled respondents. On the other hand, the qualitative approach has been used to understand the social and political aspects of the linkage by looking at the variables in the natural setting in which they are found.

4.2.1 Types and Sources of Data

To achieve the objectives of the study, both qualitative and quantitative data were collected from primary and secondary sources. The primary data were collected from households of the localities with the help of structured questionnaires and focus group discussions. Moreover, field observation and interviews with key informants and government office bearers were also utilized with the help of observation and interview guide. On the other hand, secondary data were collected from different relevant offices like office of agriculture, culture and tourism, trade, transport and communication, pastoral community, health and educational institutions, finance and economic development offices at administration zone level, *woreda* and village administrative levels as well as CSA reports (agricultural survey). Moreover, scientific journals, books, different web pages and articles were reviewed extensively.

4.2.2 Sampling Design and Procedures

4.2.2.1 Sampling Techniques

The target populations of the study are rural households in the highland and lowland *woredas* of Bale administrative zone. To get detail and representative data, sample household heads were selected through multi-stage cluster sampling techniques.

In doing so, first the 18 *woredas* of the zone were categorized into two clusters of highland and lowland *woredas*. Accordingly, the 6 highland and 12 lowland *woredas* were identified. Two *woredas*, from each agro-ecological region were selected purposefully based on their relative location. To this effect, highland and lowland *woredas* located adjacent to each other were selected on the basis of the length of common administrative boundary they shared and accessibility. In the same procedure, 4 rural *kebeles* administration (RKAs) (1 from each *woredas*) have been drawn purposely based on their livelihood variation and proximity to rural administrative *kebele* found in the other agro-ecological region. In this regard, their relative location being adjacent to each other was the basis for the selection of these RKAs. This is supposed to minimize external influence in studying the linkages between them. The same approach was employed by Huber et al. (2015) and Yanda (2003), in their study of highland-lowland interaction in Shaxi (China) and Tanzania, respectively. Then, sample household heads were selected randomly from the four RKA in proportion to the number of households. See Figure 4.1.

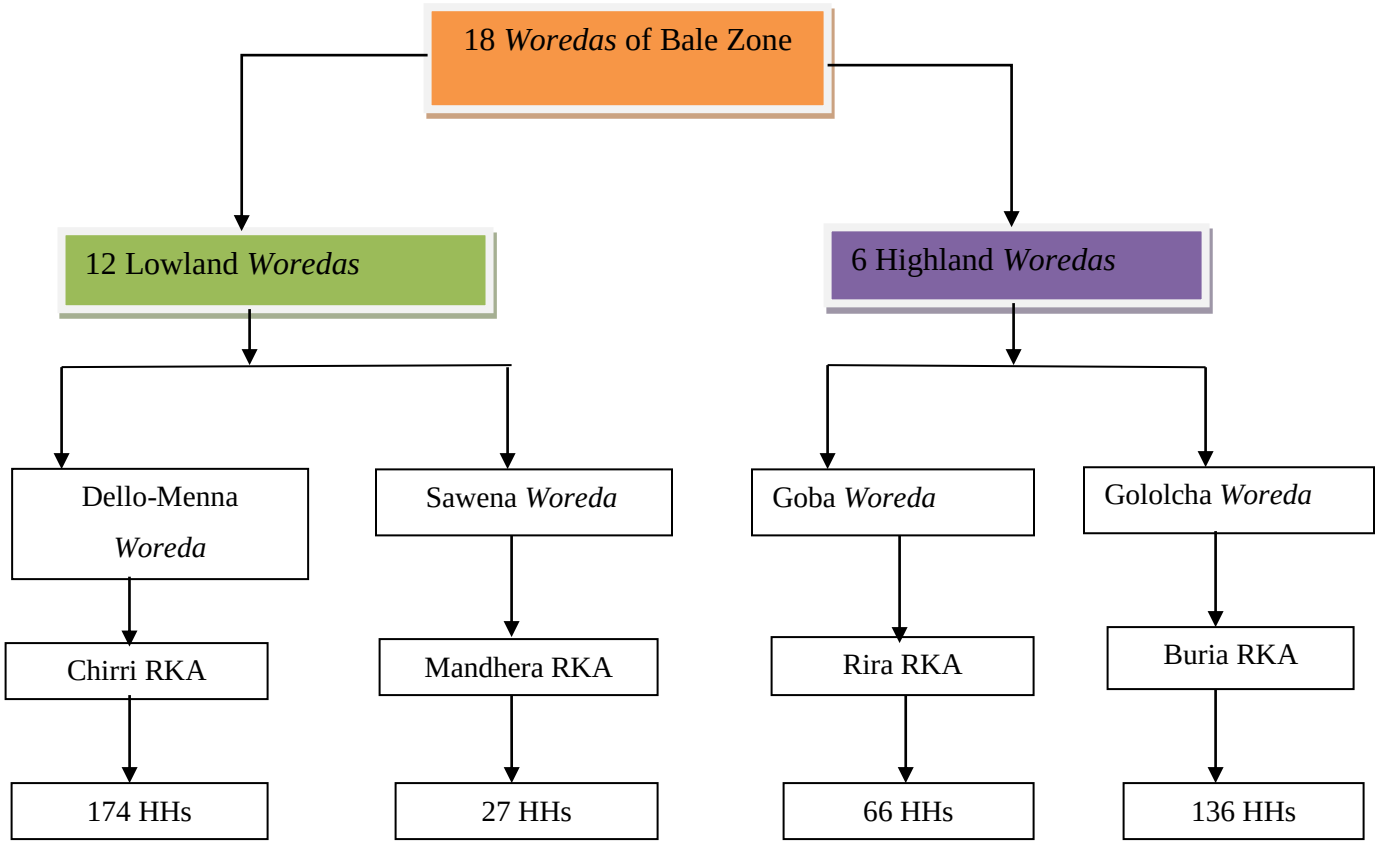

Figure 4.1: Sampling Frameworks

4.2.2.2 Sample Size Determination

There were about 1,470,163 rural household heads in the administrative zone of Bale (CSA, 2017). Out of this 539,100 (36.7%) and 931,063 (63.3%) of them were residing in the highlands and lowlands agro-ecologies, respectively. In the four selected RKAs there were about 4,337 households and it was out of these households that representative sample size was determined. Thus, for a survey design based on a simple random sampling, the sample size required can be determined based on the homogeneity of the study population, the precision of statistical analysis to be made, total size of the population and the characteristics planned to be studied (Cohen, Manion and Morrison 2000). Moreover, Yamane (1967) provides a simplified formula to calculate sample sizes. For simple random sampling, the formula assumed a 95% confidence level or 5% precision level. This formula was preferred to the others as it assumes finite population. Moreover, it assumes simple random sampling technique to draw sample respondents. Furthermore, it is preferred as it yields optimum sample size that enables running regressional and descriptive analysis.

$$n = \frac{N}{1+N(e^2)}$$

Where n= Sample Size

N= Total Household Size

e= Level of Precision

Substituting the values would give us,

$$n = \frac{4{,}337}{1+4{,}337\ (0.05^2)}$$

=366+10%= 403

Thus, out of the total households of 4337 in the four RKAs, sample size with sampling error of 5% with a confidence level of 95% is 366. This value plus 10% contingency (Yamane, 1967) for non-return and non-response survey questionnaires gives the optimum sample size to be 403. This value was equally allocated for the highland and lowland *woredas* and then proportionally distributed to the four RKAs. To this end, the proportional allocation formula derived by Kothari (2004) was employed. See Table 4.1

$$\frac{n_1}{N_1} = \frac{n_2}{N_2} = \frac{n_3}{N_3} = \frac{n_4}{N_4} = \cdots = \frac{n}{N}$$

Where, N=Total population size, n = Total sample size,

N_1=population size 1, n_1 = Sample size 1, _ _

Table 4.1: Sample Respondents among RKAs

R. No	Sample *Woredas*	Sample RKAs	Population Size			Household Head Size	Sample HHH Size
			Female	Male	Total		
1	Sewena	Mendera	986	1059	2,045	413	27 (6.7%)
2	Dello-Menna	Chirri	6241	6475	12,716	2618	174 (43.2%)
3	Gololcha	Buria	2046	2085	4131	878	136 (33.7%)
4	Goba	Rira	1073	1104	2177	428	66 (16.4%)
			10,346	10,723	21,069	4337	403 (100%)

Source: CSA, 2007 and Own Calculation of Sample Size in 2017

Moreover, purposefully selected key informants and FGD participants were used as a source of primary data. In this regard, 12 key informants were participated. Their composition includes 3 development agent workers from the three RKA (Chirri, Mandera and Buria as there was no such expert in Rira RKA), 4 *woreda* agriculture/pastoral officers from the four *woredas* and 5 elderly (2 from Rira and 1 from the other three RKA) who supposed to have adequate information about the RKA) were selected purposely based on their access to the demanded information. Moreover, 4 FGDs (one FGD per RKA) which have 32 participants were involved in the study. In all the four RKAs participants of the FGDs were a mix of young farmers/pastoralists, adult farmers/pastoralists, female household heads, male household heads with different educational background.

Finally, to reach the determined number of samples from RKA of the respective *woredas*, the name of all household heads of the RKAs was obtained from their respective RKAs, and then recorded on separate pieces of paper. Then through non-replacement lottery techniques, sample household heads were selected. Finally, contact was made with them either at their home, or in a place of work.

4.2.3 Instruments of Data Collection

The primary data, both qualitative and quantitative were collected using structured questionnaire, interview, field observation and Focus Group Discussions (FGD). To this end, both open and close ended format questions were designed to obtain information on the respondents' demographic data, socio-economic characteristics, and landholding and livestock size. For interview conducted with key informants and government officials, interview guide was prepared. For data collected through observation and FGD, checklists have been prepared.

i. Questionnaire

A wide array of data on the demographic and socio-economic characteristics of the sampled respondents, nature and type of highland-lowland linkages, factors affecting the interaction between them, livelihoods of the communities, causes and consequences of conflict were collected with the help of survey questionnaire. To this end, separate questionnaires were prepared for the highland and lowland respondents (refer Appendix I and II). They were prepared in English language and then translated to Afan Oromo language for administration, as all the respondents communicated in this language. After the instruments were prepared and tested, six enumerators were recruited from the four sampled RKAs. Then training was given to orient them about the purpose of the study, the contents of the questionnaire, strategy to approach and treat respondents and other related issues. In this regard, all data collectors satisfied the minimum educational requirement of diploma level. Among them four of them were Development Agents workers (DA), while two were *kebele* managers. To some extent this facilitated the process of data collection as they are familiar with the culture and asset types of the locality.

ii. Key Informant Interview

Interview was conducted with key informants, concerned government officials and experts in the field (DAs and *kebele* managers). During the interview, the interviewer briefed the interviewee the purpose of the study and attempt was made to make the respondents feel at ease. They explained the manner in which they give responses and get the respondent's consent for tape recording. Finally, the researcher himself conducted the interview with the help of the checklist and collected information regarding the status of the linkage between the highlanders and

lowlanders, whether it is going stronger or weaker, the reasons behind and options to be employed (refer Appendix II). Moreover, information regarding social phenomena (marriage and traditional ceremonies), the practice of transhumance, that interlink the two communities has been collected through interview with the key informants from the two agro-ecological regions.

iii. Focus Group Discussion

Four FGD (one FGD at each sample RKA) with group members of 6-9 participants were arranged with purposefully selected participants. Then data were collected on the existing social and economic interaction of the highland-lowland communities, the benefits obtained from it, livelihood strategies pursued during shocks and stresses, causes and consequences of conflict among them, and resolving strategies employed by them. The FGD was facilitated and recorded in tape recorder by the researcher at the convenience of the participants using questions considered in the checklist (refer appendix III). In all the three RKAs data were collected with the help of tape recorder except Mandera RKA who refused their consent for tape recording. Here note taking was carried out. Participants of the FGD were a mix of people of different age group, gender and economic status. Thus, elderly people, youths, people of middle age, men, and women, rich and poor were included. This helped to generate a total sum of information from their experiences and discussions.

iv. Observation

Information regarding exchange of goods and commodities between highlanders and lowlanders, availability of natural capitals like forest, grazing land, and water were also collected through field observation. It was also used to enrich data collected with other instruments. The field observation was carried out by the researcher himself at the selected two highland and lowland market areas (i.e Goba and Jarra from the highland and Bered and Menna towns from the lowlands) to comprehend goods and commodities of exchange; and in the four RKAs to grasp nature endowed resources. To this end, field observation checklist has been used to collect information on the types and magnitude of marketable agricultural products from the two agro-ecological regions.

Generally, it took about 65 days to collect primary data from the sampled respondents and key informants.

4.2.4 Validity and Reliability of Data Collection Instruments

In order to assure the validity and reliability of the data, different actions were taken. In the first place, content validity was proved by constructing the survey questionnaire in accordance with the specific objectives of the study. This enabled the researcher to design instruments of data collection that fit the purpose. In the second place, the content validity of the instruments has been assured with the evaluation of experts in the field. To this end, the designed survey questionnaires were tested for content validity by the supervisor. Then ambiguities were removed and questions were modified accordingly. In addition, to avoid contamination of data, participants of the pilot survey were excluded from the main survey. Furthermore, an attempt was made to avoid non-return questionnaires by engaging adequate number of enumerators. Non-responding sampled household heads were replaced by other household heads. Finally, data collected through questionnaire, field observation, FGD and interview were triangulated as demanded by the concurrent triangulation design strategy.

On the other hand, since reliability is a necessary precondition of validity, the data collection instrument, particularly the questionnaire collected from 40 pilot respondents was tested with Cronbach Alpha coefficient. This coefficient of Alpha is used to test internal consistency of the instrument (Creswell, 2012). This test is more efficient for continuous variables items in the instrument. However, the current instrument reliability analysis was made individually on subclasses as it has various scales of measurements. This option provided a value of Cronbach Alpha on each item on the scale (Field, 2009). The reliability test of the survey questionnaire run in subclass procedure resulted in alpha coefficient of 0.73 which is satisfactory as it is greater than 0.7.

4.2.5 Methods of Data Analysis

The analysis of data collected both from primary and secondary sources have been carried out with the help of various tools and different statistical methods after cleansing and entry to computer program.

To present the socio-economic and demographic characteristics of respondents' descriptive statistics like frequency, percentage and averages were employed. Analysis of variance (ANOVA) has been used to compare average age of household heads, average household size and mean income of household heads in the two ecological regions (highlands and lowlands) and to identify variables with significant RKA level differences and to compare livelihood activities among the highlands and lowlands. The data was first tested for normal distribution using Shapiro-Wilk test. A Levene test was employed to detect homogeneity of the variance group.

Moreover, multiple linear regressions have been used to measure the livelihood outcome of household heads in the highland and lowland agro-ecology (objective 4). This livelihood outcome was approached from the total annual income of household heads obtained from crop production, livestock rearing and off/non-farm activities. Thus, the regression model includes household head income (Y) and the different income sources as response variables (Xs). The independent variables include household size, educational level, total agricultural land area per household heads, livestock number of the household heads, age of the household head, number of laborers in the household, total crop product per household, and dummy variables for the location of the households in the highland or lowland (Huber et al., 2015). Thus, the dependent variable livelihood outcome was regressed on the above independent variables. The equation is expressed as:

$$y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \cdots + \beta_n x_{ni} + \varepsilon_i$$ (Field, 2009)

Where: B_0 is regression constant and B_1 is regression slope

Y= Livelihood outcome of household heads (Annual income of household heads)

The explanatory variables (Xi) include different household heads and farm characteristics.

Household characteristics:

X_1= household size (numbers),

X_2= age of the household head (years),

X_3= sex of the household head (Female= 0, Male =1)

X_4= educational level of household head (dummy Illiterate = 0, Literate = 1),

X_5= number of able labor force in the household,

X_6= settlement ecology (dummy 0=highland 1=lowland)

X_7= status in the agro-ecology (0= non-migrant 1= migrant)

X_8= main economic activities (0= non-farm, 1= farm)

X_9= Linkage of HH to the adjoining agro-ecological communities (0= have no link 1= have link)

Farm characteristics:

X_{10}= total agricultural landholding area per capita for each household heads,

X_{11}= livestock number in TLU,

$X_{12=}$ total crop product in Kg/HH,

The fulfillment of assumption such as: continuous dependent variable, the variance of the distribution of dependent variable should be constant for all variables of the independent variables, the relationships between the dependent variable and each independent variables should be linear, the residue is normally distributed and uncorrelated with the predictors and all observations should be independent and independent variables should not be correlated to each other and with predictors was tested and then the regression analysis was made. Accordingly, multicollinearity analysis was made and those variables correlated above the tolerance value and significance of the beta coefficient was removed from the model.

On the other hand, binary logistic regression extends linear regression to the situation where the dependent variable is dichotomous (Hosmer & Lemeshow, 2000). Hence, binary logistic regression analysis was employed to identify factors that determine the strength of highland-lowland linkages (objective 2). The dichotomous dependent variable (Y), strength of the linkage, either strong (Y=1) or weak (Y=0), was explained by explanatory variables (Xi) like socio-cultural factors (existence of relatives or friends, participation in social affairs, looking educational and health services), economic factors (exchange of farm products, livestock, fire woods or charcoal, honey or coffee and labor) and ecological factors (availability of pasture, water, arable land and forest). Therefore, the role of kinship ties, social service, market, labor and natural resources in the study area have been examined.

Before the analysis was made, the data was checked against assumptions like meaningful coding of variables, dichotomous and categorical dependent variable, mutually exclusive and exhaustive variables, linear relationships between the logistic regression equation and dependent variable

and larger sample size. Then Hosmer and Lemeshow's goodness of fit was made to assess how logistic regression model best fits to show closeness of values of the predicted and observed with the help of entered and stepwise methods. Case wise listings of residuals, correlations of estimates, iteration history, and CI for exp. (B) were considered. Thus, the following logistic regression equation was employed

$$\text{logit}\,[p(x)] = \log\left[\frac{p(x)}{1-p(x)}\right] = a + b_1x_1 + b_2x_2 + b_3x_3 \ldots$$

(Field, 2009)

The equation was rearranged to calculate the value of *p*

$$p = \frac{exp^{(a+b_1x_1+b_2x_2+b_3x_3\ldots)}}{1+exp^{(a+b_1x_1+b_2x_2+b_3x_3\ldots)}}$$

(Field, 2009)

Where *p* = the probability that a case is in particular category

exp = the base of natural algorithms i.e 2.72

a = the constant of the equation

b = the coefficient of the predictor variables

Thus, the dichotomous dependent variable:

Y= Strength of highland-lowland linkages (1= strong, 0= weak) was explained by independent variables (Xi):

X_1= Socio-cultural factors i.e.

Existence of relatives or friends	1= yes	0= no
Participations in Social Affairs	1= yes	0= no
Looking Education and health services	1= yes	0= no

X_2= Economic factors i.e.

Exchange of farm products	1= yes	0= no
Exchange of livestock	1= yes	0= no
Exchange of fire woods or charcoal	1= yes	0= no
Exchange of honey	1= yes	0= no
Exchange of coffee and	1= yes	0= no
Exchange of labor	1= yes	0= no

X_3= ecological factors like:

Availability of pasture	1= yes	0= no
Availability of water	1= yes	0= no
Availability of arable land	1= yes	0= no
Availability of forest	1= yes	0= no

IBM SPSS version 20.0 soft-ware has been employed to analyze the data. The analyzed data have been displayed with the help of tables, graphs and charts.

The qualitative data was analyzed by transcribing the recorded responses of interview and FGD. Then by omitting the names of the respondents, narration was made by thematic coding. Thus, qualitative data obtained from primary sources was used to triangulate with quantitative data concurrently.

CHAPTER FIVE

DEMOGRAPHIC AND SOCIO-ECONOMIC PROFILE OF THE SURVEYED HOUSEHOLD HEADS

In this chapter an attempt was made to present the demographic and socio-economic profile of the surveyed population. It includes the age and sex composition, marital status and family size, ethnicity and religious affiliation as well as educational status. The data were collected from the two agro-ecological zones through semi-structured (open and close ended) questionnaires. Such data are important as they have direct implication on the linkages of the highlanders and lowlanders as well as the choice of livelihood activities.

5.1 Sex and Age Composition

The survey result revealed that the overwhelming majority (86.4% or 348) of the sampled respondents were males, while the remaining 13.6% (55) of them were females. This is attributed to male dominating household heads in the study area. This in turn expected to have implications on the linkage between the highlanders and lowlanders as it regulates the types of economic activities they prefer to engage in. Habitually males tend to engage in farming and livestock rearing while females prefer to involve in trading and rearing small size livestock.

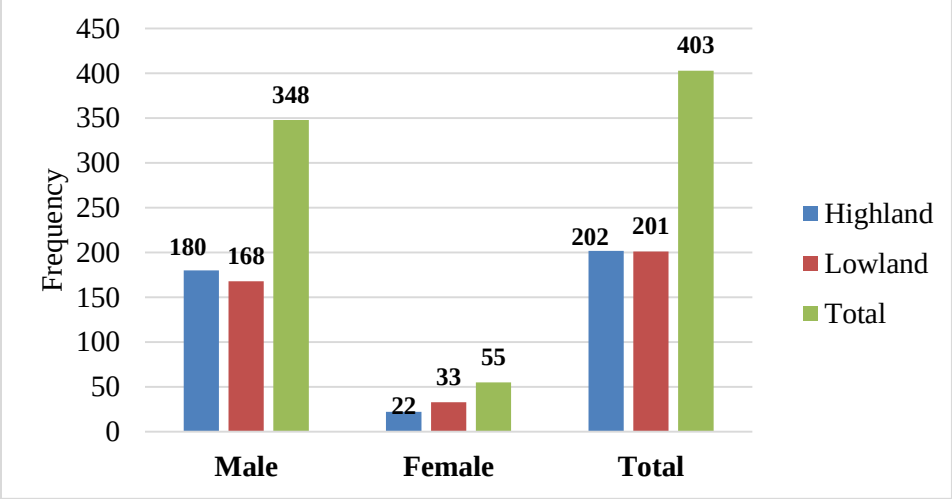

Figure 5.1: Sex Composition of Sampled Household Heads s across Agro-ecological Regions

Source: Field Survey, 2017

Moreover, the sex distribution of the sampled household heads revealed that the proportion of female-headed households is greater in the lowland areas as compared to the highland regions. This may attribute to the heavy burden shouldered by females in the lowland regions. Here, they are responsible to construct hat, to look for cattle and milk them, to prepare food for the household members, maternal responsibilities, to name a few. Thus, they acquired the basic skills to pursue their livelihoods in the absence of their husband.

Concerning the age distribution of the respondents, the survey result indicated that 63.3% and 32.8% of them are found in the age ranges of 30 to 60 and 15 to 30 years, respectively. It is followed by 4% above the age of 60 years. The result is comparable with the findings of Workneh (2011).

It is also worth noting the age distribution of sampled household heads across their settlement agro-ecology as it has its own implication on the linkage between the highlanders and lowlanders as well as their livelihood strategies. Accordingly, 32.3% and 31% of the sampled household heads in the highlands and lowlands, respectively, were in the age ranges of 30 to 60 years. It is followed by 14.9% and 17.9% of the household heads in the age ranges of 15 to 30 years, in the highlands and lowlands, respectively. The result of one-way ANOVA showed that average age of household heads has no significant relation with the four RKA settlements at p-value of 0.05 (See Appendix IV). Thus, the difference in the age distribution of the sampled household heads between the highlanders and lowlanders seems not significant.

In general, from these figures it can be inferred that about two-third of the sampled household heads were found in age ranges of 30 to 60 years. This implies that most of the household heads in both agro-ecological regions were found in the active age groups. Hence, it is likely to contribute for strong highland-lowland linkage.

Table 5.1: Age of Sampled Household Heads across Agro-ecological Regions

Age group	Agro-ecological Regions					
	Highland		Lowland		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
15-30	60	14.9	72	17.9	132	32.8
30-60	130	32.3	125	31.0	255	63.3
>60	12	3.0	4	1.0	16	4.0
Total	202	50.1	201	49.9	403	100.0

Source: Field Survey, 2017

5.2 Marital Status and Household Size

In terms of marital status, the survey result indicated that 91.8% of the sampled household heads respondents were married. Few proportions (3.2%) and (2.9%) of the sampled household heads were single and widowed, respectively. The remaining 2% of the sampled respondents were divorced. Considering the distribution of marital status across the two ecological zones, 44.4 % of the sampled household heads respondents in the highland and 47.4% in the lowland agro-ecological regions were married (Figure 5.2). Besides, the survey result indicated that 2.5% and 0.5 % of the sampled highlanders and lowlanders, respectively, were widowed. Furthermore, about 2.0% of the sampled household heads in the highlands were divorced.

Hence, it is notable that greater proportions of household heads in both agro-ecological zones were married. This implied that household heads engaged both in crop production and livestock rearing are boasted in large family size as marital status has direct impact on household size. This is in line with the findings of Desalegn and Markos (2016) and Doyo (2017).

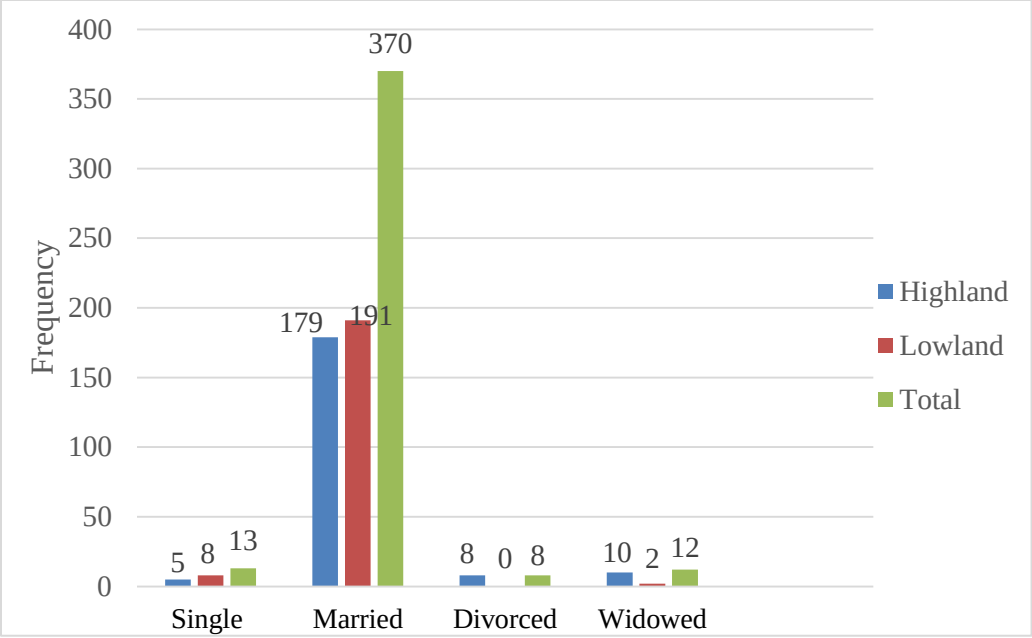

Figure 5.2: Marital Status of Sampled Household Heads across Agro-ecological Regions

Source: Field Survey, 2017.

In the survey, the sampled household heads were also requested to indicate their family size. Accordingly, the survey result revealed that 16.9% of them have household size that ranges from 1 to 3. Fewer (10.7%) household heads have household members that range from 1 to 3. Larger proportions (37%) of the respondents have household size that ranges from 4 to 6. Significant proportions (46.2%) of the respondents have extremely large household size (greater than 7).

In considering the relative household size between the two agro-ecological regions, sampled households that accounted for 20.1% have large household size that ranges from 4 to 6. In the same way, larger proportions (16.9 %) of sampled household heads in the lowland agro-ecological zone have family size that ranges from 4-6 persons.

The average household size of the sampled household heads was 7, which is greater than the national (4.16) and regional (4.84) averages (CSA, 2007). It is even greater than the rural average of Bale administrative zone (5). The maximum and minimum family size is 20 and 1, respectively. This gives the rage to be 19. In the survey it was also found that the average household size is higher among the lowlanders (7.98) in comparison to the highlanders (5.9). The result of one-way ANOVA also showed that average household size is significantly related to the

agro-ecological region of settlement at p-value < .001, and can be concluded that the average household size of the two agro-ecological regions were different.

In general, most of the sampled household heads in both agro-ecological zone has large family size (refer Table 5.2). This may be attributed to socio-economic factors like polygamy, poor access to birth control methods and response to the labor intensive nature of rural livelihoods. This in turn expected to contribute for strong socio-economic linkages of the highlanders and lowlanders, as large household size demands more diversified livelihoods and encourage movement for social and economic reasons.

Table 5.2: Sampled Household Heads by Family Size across Agro-ecological Regions

		Agro-ecological Region				**Total**	
		Highland		Lowland			
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Family Size	1-3	43	10.7	25	6.2	68	16.9
	4-6	81	20.1	68	16.9	149	37.0
	7-9	55	13.6	50	12.4	105	26.1
	>=10	23	5.7	58	14.4	81	20.1
	Total	**202**	**50.1**	**201**	**49.9**	**403**	**100.0**

Source: Field survey, 2017

5.3 Religious Affiliations and Ethnicity

Regarding religion, the overwhelming majority (99%) of the sampled respondents were Muslims. The remaining very few proportions (1%) of them were followers of Orthodox Christian (Table 5.3). Moreover, the survey result shows that there is slight difference in the religious affiliation of the sampled highlanders and lowlanders. Followers of Christianity were relatively more concentrated in the highlands of the zone. This result coincides with the national census results of 2007 for the sampled *weredas*. See table 3.6. This may have its own implication on the magnitude of the highland-lowland linkages as households that practice similar religions likely have stronger interconnection.

Table 5.3: Ethnicity and Religious Affiliations across Agro-ecological Regions

		Agro-ecological Regions				Total	
		Highland		Lowland			
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Religion	Muslim	200	49.6	199	49.4	399	99.0
	Orthodox	3	0.7	1	0.3	4	1.0
	Others	0	0.0	0	0.0	0	0.0
	Total	**202**	**50.1**	**201**	**49.9**	**403**	**100.0**
Ethnic Group	Oromo	202	50.1	201	49.9	403	100.0
	Amhara	0	0.0	0	0.0	0	0.0
	Others	0	0.0	0	0.0	0	0.0
	Total	**202**	**50.1**	**201**	**49.9**	**403**	**100.0**

Source: Field Survey, 2017

Furthermore, in terms of ethnic composition, all the sampled respondents were Oromos (100%). Such ethnic homogeneity may have its own implication on the social linkages of the highland and lowland communities. This could have resulted stronger linkages, although this might have brought no or little social and cultural elements to one another because the two communities were in a uniform socio-cultural settings.

5.4 Educational Status

As illustrated in Figure 5.3 below about 34% of the sampled respondents were illiterates. The others which account for 33.3% can read and write. 18.1% of them have attended primary education (grade 1-4). Furthermore, 11.4 % of the sampled respondents reported that they attended basic education (grade 5-8). Only 2.2% and 1.0% of them attended secondary (grades 9-12) and diploma or above in their educational status, respectively. This implies that more than half (62.5 %) of the sampled household heads were generally literate.

When we compare the educational status of communities in the two ecological regions, the highlanders were relatively in a better literacy status. For instance, the proportions of sampled respondents that can read and write found to be 19.1% in the highlands and 14.1% in the lowlands. On the other hand, the proportion of illiterates was 12.9% in the highlands and 21.1% in the lowlands. This might have resulted from the relatively better access to social infrastructure such as, development of educational services in the highlands of Bale administrative zone.

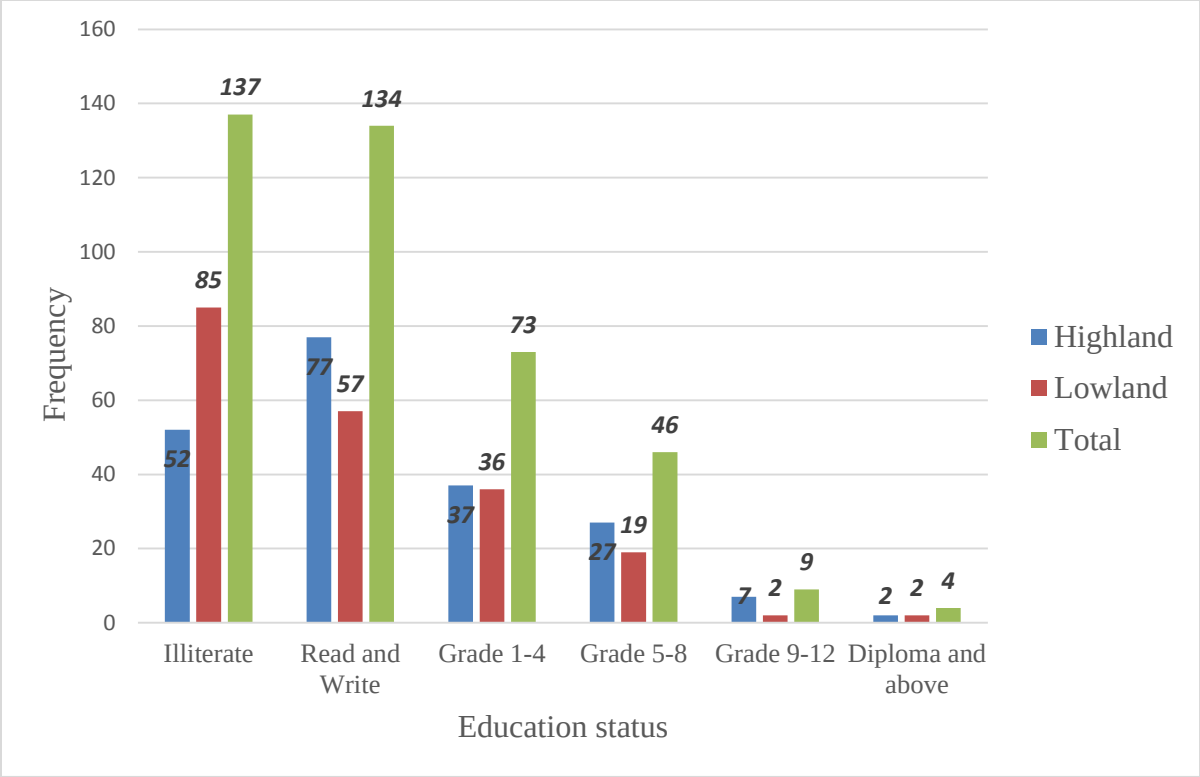

Figure 5.3: Educational Level of Sampled Households across Agro-ecological Regions

Source: Field survey, 2017.

The other equally important demographic variable that affects highland-lowland linkage is language. In this regard, almost all (99.5%) of the surveyed respondents' mother tongue is *Afan Oromo*. Very few proportions (0.5%) of them first learned Amharic. All the Amharic speakers were from the highlands. However, few of the sampled respondents in Mandera rural administrative *kebele* (lowland) can also speak Somali language. This implies that the impact of language as barrier of interaction between the highlanders and lowlanders in the two agro-ecologies could have been not significant as the neighboring communities speak each other's language. Thus, this could have positively contributed to highland-lowland linkages.

5.5 Occupational Status

The survey result revealed that the overwhelming majority (83.9%) of the sampled respondents were engaged in agriculture. Few respondents were engaged in trading (5.7%), labor work (5.4%), housemaid (3.0%) and office work (1.8%). See Table 5.4 below.

In the attempt made to understand the distribution of these occupational categories across the two agro-ecological regions, it was found that agriculture is equally practiced in the highlands (42.2%) and lowlands (41.7%). However, it shows variation in the types of agricultural activities. And this laid basis for highland-lowland linkages as none of them are self-sufficient in their production due to various reasons.

Table 5.4: Occupational Categories of Sample Households across Agro-ecological Regions

Occupational Status of the Household head	Agro-ecological Regions					
	Highland		Lowland		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Farmer/Peasant	170	42.2	168	41.7	338	83.9
Merchant	14	3.5	9	2.2	23	5.7
Housemaid	3	0.7	9	2.2	12	3.0
Government Employee	2	0.5	6	1.5	8	2.0
Labor Work	13	3.2	9	2.2	22	5.5

Source: Field Survey, 2017.

5.6 Status in the Rural *Kebele* Administrations (RKAs)

In the survey, the sampled respondents were requested to indicate their status in RKAs. Out of the total sampled respondents, 8.7% (35) of them did not responded to this question. Thus, of the sampled respondents, who respond to this question, the greater proportion (94.3%) of them indicated that they are non-migrant. The remaining 5.7% (21) of them revealed that they are migrants. See Figure 5.4. Out of these migrant household heads, bigger proportions (85.7%) of them are found in the lowlands, who migrated from the highlands of the same administrative zone and other administrative zones. Furthermore, these respondents were asked to indicate their place of origin. Accordingly, all of them replied that they came from highland *woredas* of Oromia and other regional states of Ethiopia. This implied that household heads move within the same administrative region from one agro-ecological region to the other as livelihood strategies. And this rural to rural migration is a common phenomenon in Ethiopia too.

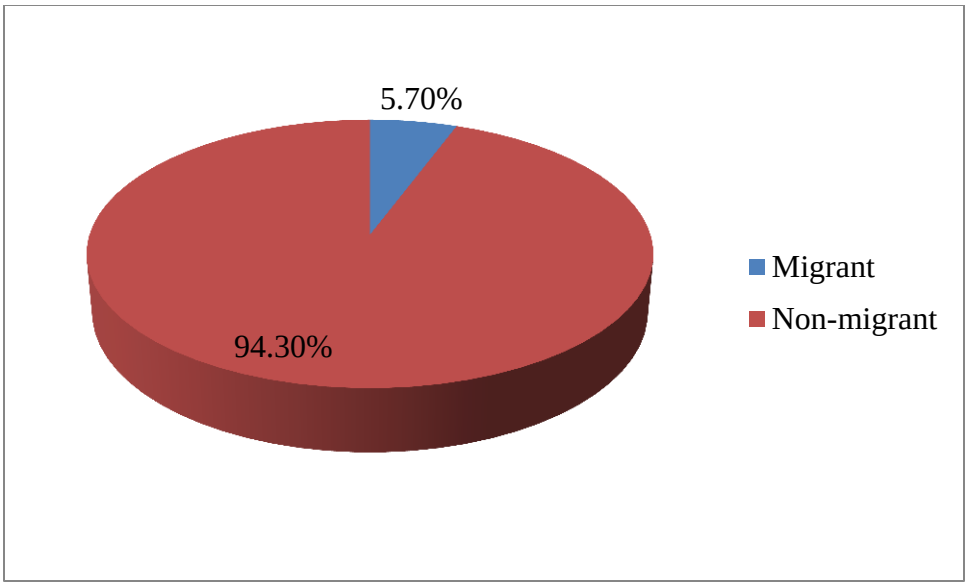

Figure 5.4: Residence Statuses of Sampled Household Heads in the Administrative *Kebeles*

Source: Field Survey, 2017.

Moreover, these immigrants were requested to indicate the length of year since they immigrated. Accordingly, on average they stayed for 20.24 years in the destination RKAs. The maximum and minimum year of residence was found to be 42 and 3 years, respectively. This coincides with the year of resettlement schemes of 2000 implemented by relocating rural household from east Hararghe zone to the lowlands of Bale zone administration, principally Dello-Menna *woreda*.

5.7 Conclusion

In the study area, male headed households are dominant and this is also true for rural Ethiopia. The male headed households are more common in the highlands of the administrative zone as compared to the lowlands. The mean age of the sampled household heads was 37.7, while the maximum and minimum were 89 and 18 years, respectively. However, the difference in the age distribution of the sampled households between the highlanders and lowlanders is not much significant (p-value= 0.208). Greater proportions of households in both agro-ecological zones were married. This implied that households engaged both in crop production and livestock rearing are boasted in large household size as marital status has direct impact on household size. But the average household size of the sampled respondents showed great variation between the highlanders and lowlanders (p-value= 0.001). Due to socio-cultural factors, it was found to be

higher in the lowlands. And this is expected to expedite the link expressed in the form of transfer of culture, information, capital and innovation. In terms of religion, language and ethnic compositions, high degree of homogeneity was observed between the highlanders and lowlanders. Regarding education, the highlanders are in a better position. This is attributed to better development of educational services in the highlands of the zone as compared to the lowlands. On the other hand, though the types of agricultural activities practiced shows slight variation, agriculture was found to be the mainstay of both highlanders and lowlanders. In general, the demographic and socio-economic variables analyzed above are important indicators of the types and magnitudes of highland-lowland linkages. Religion, ethnicity and language are important indicators of social linkage, while occupational status and other demographic variables are important indicators of economic linkage. Thus, the distributions of socio-cultural variables between the two agro-ecological regions do not show great variation. This is ideal condition to have strong highland and lowland linkage. On the other hand, variation in agricultural products and natural resource distribution due agro-ecological difference, positively contributed to highland-lowland linkage.

CHAPTER SIX

TYPES, NATURE AND EXTENT OF HIGHLAND-LOWLAND LINKAGES

Highland and lowland regions throughout the world, particularly in developing economies, are interlinked through multifaceted economic and socio-ecological interfaces on various levels. This chapter presents results and discussions of the analyzed data collected with the help of different instruments. It mainly focuses on analyzing types, nature and magnitude of highland-lowland linkages in Bale administrative zone.

In the analysis, it is worth-noting to distinguish the existence of highland-lowland linkage in the first place. To this end, the respondents were requested to indicate their interaction with their neighboring highlanders/lowlanders. Accordingly, out of the 403 total sampled respondents 399 of them replied to this question. The remaining 4 respondents skipped the question. Thus, out of the total sampled household heads that answered the question, the overwhelming majority (82.2%) of them confirmed their interaction with the adjacent agro-ecological communities. The remaining 17.8% of them denied the ongoing interaction.

Table 6.1: Highland-Lowland Linkage

	Response	Agro-ecological Regions					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Have you ever visited the neighboring Highland/Lowland RKA?	Yes	174	43.6	154	38.6	328	82.2
	No	27	6.8	44	11.0	71	17.8
Total		201	50.4	198	49.6	399	100

Source: Field Survey, 2017.

As indicated in the Table 6.1 above, 43.6% and 38.6% of the highland and lowland respondents, respectively, witnessed the existence of interaction between communities of the highland and lowland agro-ecologies. On the other hand, out of the 71 (17.8%) respondents who denied the existence of linkages, 6.8% and 11% of them were from the highland and lowland agro-ecological zones, respectively. From these figures it is possible to infer that there is linkage

between the highlanders and lowlanders of the administrative zone. A similar study made in Tanzania by Yanda (2003), revealed the presence of highland-lowland interdependencies. However, in his study he identified that all the highlanders and lowlanders witnessed the existence of highland-lowland linkage. Hence, once this fact was established, it is promising to deal with the types and magnitudes of the linkages. Thus, based on the above observations, it is possible to consider that there were linkages between the two communities.

6.1 Types of Highland-lowland Linkage

Subsequently, those sampled respondents (328), who indicated the presence of highland-lowland linkages, were requested to specify the reason for visiting the neighboring highland/lowland agro-ecology. Accordingly, the respondents identified highland-lowland linkages of ecological, economic and socio-cultural origin. These type of linkages though not comprehensively studied by a single author, they were explored by several scholars like Tolossa and Baudouin (2004), identified ecological, economic and social linkages; Stoffel et al. (2002) and Yanda (2003), recognized the socio-economic and biophysical linkages; Jodha (2002) and Workneh (2011), looked at the economic dimension of highland-lowland linkages. Table 6.2 presents the drives for commuting to one another agro-ecological region. The types of linkages are identified from their reasons of commuting.

Table 6.2: Types of Highland-Lowland Linkages

Reason for commuting to the neighboring highland or lowland RKA	Response rate				Total	
	Yes		No			
	No	%	No	%	No	%
i. Ecological Linkages	**211**					
Look for water for livestock	73	22.2	255	77.8	328	100
Look for pasture land	84	25.6	244	74.4	328	100
Look for forest and forest products	15	4.6	313	95.4	328	100
Look for arable land	39	11.9	289	88.1	328	100
ii. Economic linkages	**516**					
Exchange of agricultural products (cereals, fruits, oilseeds, vegetables)	157	47.9	171	52.1	328	100
Exchange of agricultural products (livestock and livestock products)	156	47.6	172	52.4	328	100
Exchange of forest products (firewood, charcoal, timber, construction wood and etc)	18	5.5	310	94.5	328	100
Exchange of forest products (honey and forest coffee)	145	44.2	183	55.8	328	100
Look for job opportunities	40	12.2	288	87.8	328	100
iii. Social Linkages	**760**					
Visit relatives and friends	281	85.7	47	14.3	328	100
Participate in social affairs (wedding, mourning, festivals, negotiation, other)	234	71.3	94	28.7	328	100
Attend education (Secondary and tertiary)	43	13.1	285	86.9	328	100
Look for health services (Referral hospital)	202	61.6	126	38.4	328	100

Source: Field Survey, 2017.

Accordingly, survey result showed that the highland and lowland communities of the region showed stronger interaction for social purposes and followed by economic drives. The succeeding sub-sections deals with these linkages categorically.

6.1.1 Ecological Linkage

As illustrated in Table 6.2, about 211 responses indicated that the highland and lowland people interact for ecological reasons like to look for pasture, water, forest and forest products as well as arable land. These types of linkages mainly resulted from differences in the endowment of ecological resources between the highland and lowland ecologies. In this regard, the highland of Bale is fairly endowed with ecological resources like surface water (rivers and springs), forest, grazing land and arable land. On the other hand, the lowlands are gifted with ecological resources like sub-surface water which is manifested by occurrence of dug-wells, an extensive coverage of pasture land and shrub lands. It is the common interest to utilize these resources that create a platform for interaction between the highland and lowland communities. It seems, there is complementarity, an intervening opportunity, in this regard between the highland and lowland communities; hence the need for interaction.

The highlands are believed to be the reservoir of water resources. The personal observations and experience of the researcher indicated that many small and large rivers and streams originated from the highlands and drain to the adjacent lowlands of the administrative zone. Thus, the highlands are continuous suppliers of surface water. On the other hand, the lowlands are recipients of this resource. Moreover, interviews made with key informants revealed that the lowland communities devised different mechanisms to store and utilize water for time of moisture stress. One of these strategies is to dig deep water wells. The other strategy adopted is preparation of private and communal water ponds. This type of water preservation is preferred by the highlanders too for their livestock. However, the key informant (development agent of Mandera RKA) revealed that such water preservation strategy created conflict of interest between the agricultural and health sectors, as the stagnant water becomes fertile ground for the reproduction of malaria in the lowlands.

The same informant indicated that in the normal times, i.e during wet (*ganna*) season, the lowlanders use their own water wells and the flooding river water for their cattle and they move to the highland regions to look for streams and spring water during the dry season as most of

their water sources dried up. Hence, the lowland communities engage in intra and inter-*woreda* movements. In the former instance, they move from one rural *kebele* to another i.e in the same agro-ecology. A typical case raised in the interview was movement of cattle from another rural *kebele* to Digelu rural *kebele* administration in Sawena *woreda* and to Melka-Amana rural *kebele* administration in Dello-Menna *woreda.* This is mainly because Digelu rural *kebele* administration has about 40 springs, while Melka Amana rural *kebele* administration has a big river called Welmel (the tributary of Genale River). In the latter case, they move from one agro-ecological zone to another when the dry season prolongs. In this case they move from Sawena *woreda* to Gololcha *woreda* but in rare cases from Dello-Menna *woreda* to Goba *woreda*. In the same fashion, the highlanders move to the adjacent lowlands to look for "*haya"* (mineral licks) or "*hora*" (mineral water) after the rainy season. Therefore, water is found to be an important ecological resource that plays role in interfacing the highland and lowland communities by 22.2% of the respondents. Hence, streams are important in linking the highland-lowland agro-ecologies via flow of ecosystem services (SHARE Bale Eco-Region, 2017). In the same way Yanda (2003) confirmed that water resource is responsible for the interdependencies between communities in the highland and lowland.

In the survey it was found that the other vital ecological resource that interconnects the highland and lowland communities is grazing land in which about 26% of the respondents reported they move one to another for looking pasture, fodder and shade. In this regard, Belete and Aynalem (2017) indicated that the lowlands provide pasture for the highlanders during the wet season, while the highlands offer fodder, browse and shade during the dry season for the lowlanders. Although its size varies; both the highlands and lowlands are well-endowed with these resources. In the lowlands of Bale, the grazing lands are extensive as compared to the highlands. However, in the highland areas, the grass lands are dwindling from time to time due to expansion of farm lands and other reasons (Flintan et al., 2008). Interview made with the key informants (development agents) in Sawena and Gololchs *woredas* witnessed that the highlanders often move to the lowlands during summer (wet) season to look for grass for their cattle. This might be due to the fact that their farm fields were covered with crops in this period. Likewise, the lowlanders travel to the highland regions during the winter (dry) season to look for crop residues in the farm fields and pasture to feed and shade their cattle in the forests. In this regard, one of

the key informants (elder) in Sewena *woreda* expressed the situation of their interaction as follows:

> We used to graze our cattle on the farm fields of the highlanders' during the dry season. We even move as long as the state farm of "Dinkiti" (found in Ginnir *woreda* about 30Km away from Mandera RKA) when the drought was extended. We usually favored to travel to the forest of *Kubayou* situated northwest of us at shorter distance. However, the communal grassland found there was getting dwindled as the highlanders began to expand their farmland there. Actually, we have also started farming recently in the adjacent areas as an adaptation strategy.

The same idea was reflected by the key informant interview made in Dello-Menna *woreda*. Although crop residues are insignificant in the highlands of Goba *woreda* (Rira RKA), the lowlanders were hosted in the forests of Harena and Goba for two to three months in the dry season, provide they observe not to damage trees, coffee and beehives of the local community. In the case of Goba *woreda*, such transhumants reside either in their own tents or in relative's house. Key informant (elder) in Rira RKA expressed his observation regarding their ecological interaction as follows.

> The lowlanders from Dello-Menna *woreda* including residents of Chirri RKA graze their cattle on our farm fields, particularly barley and wheat fields in the months of January and February (winter). They soon leave us when the *ganna* rain started. Alternatively, they used to move to the lowlands of Dello-Menna to the extremes of *Berak*[6] RKA and Welmel river base to look for pasture in the same months.

From this expression it can be inferred that the lowlanders of Dello-Menna have two options of pasture land during the dry seasons. Particularly, pastoralists of Chirri RKA move either to *Berak* rangeland or Goba and Harena forests.

[6] Berak is the largest range land found in Dello-Menna *woreda*

Plate 6.1: Dry Season Grazing in the Highlands of Goba (*Sannate* Plateau)
Source: BERSMP, 2008

The other demand of movement between the two agro-ecological regions derived from browsing animals, particularly camels and goats. Key informants in Sawena and Dello-Menna *woredas* indicated that they travel longer distances with their camels to look for their favorite browse named as *beles*[7] in the more prolonged drought season. Moreover, the lowlanders in Sawena *woreda* visited the *kubayou* forest in Gololcha *woreda* for browsing their camels and goats. Hence, both the lowlanders' pastureland and highlanders' crop fields and forests serve as a platform of interaction between the highland and lowland communities of the zone as they complement each other's shortfalls.

Nevertheless, small proportions of the respondents (4.6%) witnessed forest resources also played significant role in linking the highlanders and lowlanders of the administrative zone. Key informant interview results indicated that the lowlanders utilize forest and its products for various purposes. To mention some, as a source of pasture for grazing field and shade in the dry seasons, as a source of income by selling charcoal and fire woods, as a source of forest coffee and honey production. In this regard, an important scenario told by key informants in Rira RKA and confirmed by the Chirri RKA is that the lowlanders use the opportunity of hanging beehives

[7] *Beles* is a herbaceous vegetation that adapts drought

to harvest honey in the forest regions of the highlands for free. It is the responsibility of the highlanders to protect the beehives from damage and theft in the absence of the owners (lowlanders), as they come from distant localities for this purpose. Hence, they are expected to come only twice in one harvest season. The first is for "*gagura ulu"*, which means to clean and hang the beehives on big trees and the second is to harvest the honey. In addition, they can get access to forest coffee cultivation either freely, based on *soduma* (marriage ties) or *ante* (kinship ties) or on contractual basis. Similar protection has been made for the coffee plantation which belongs to the lowlanders. This is also evident between the highlanders of Goba *woreda* and lowlanders of Dello-menna *woreda*, specifically Rira and Chirri RKAs. From these scenarios it is possible to say that wise utilization of forest resource in this regard could result in a strong linkage, which manifests interaction between the highlanders and lowlanders of the administrative zone.

Arable land is the other ecological resource that created platform for interaction of the highlanders and lowlanders. This was witnessed by 11.9% of the sampled respondents. Field observations showed that the land use of the highlanders and lowlanders have slight difference. Principally, the highlanders utilize their land more for farming and grazing as they engaged with mixed farming. The lowlanders on the other hand mainly exploit their land holdings for pasture purpose. However, due to different factors like population growth, environmental degradation, climatic variation and decrease in the productivity of land, both the highlanders and lowlanders have expanded land uses to marginal areas. In this regard, it is worth noting to cite what some of the key informants (elder) in Sawena and Goba *woreda* stated.

> Previously we were entirely pastoralists. But these days we started to cultivate some cereals as strategy to adapt the recurrent drought that massively killed our livestock. However, we are not still successful as the climate has yet normalized and become promising. Not only this, we do not have good experience of plowing as that of the highlanders.

Likewise, one key informant (elder) in Goba *woreda* of Rira RKA stated as follows:

> I lived for 42 years in this *kebele* (Rira). My livelihood was exclusively dependent on cattle rearing and honey production. It was during the *Dergue*

> period (1974 to 1991) that I started cultivating barely and then cabbage. I remember this shift in a means of livelihood was due to the prolonged hunger that affected me and the whole nation (1985).

These scenarios implied that communities in the extreme highlands like Goba *woreda* and in the lowlands diversified their mainstays by engaging in crop production. This in turn created further demand on arable lands in both agro-ecologies of the zone. This further drive both communities to extend their farm land to the adjacent agro-ecologies. Usually, the highlanders expand their farm land to the lowlands due to reduction of productivity in their localities because of land fragmentation and over cultivation. Besides, some of the lowlanders were begun to engage in farming in adjacent to the highlands as a means of livelihoods diversification as the recurrent drought make their livings insecure. This common interest for the same locality consequentially generated a relationship (be it hostile or permissible) between the highlanders and lowlanders. Therefore, it is reasonable to conclude that utilization of arable land as an ecological resource has been an important driver of the linkage between the highlanders and lowlanders of Bale administrative zone. This conclusion is in line with the findings of Yanda (2003). In his observation, Yanda recognized the involvement of pastoralists in farming activities as a coping strategy of two factors. The first is due to unfavorable climatic conditions that resulted in drought and scarcity of water and grassland. The second is an influx of cultivators to the range lands that reduced the pasture grounds. The same idea was reflected by Soini (2006) that reported the expansion of farming to the lowlands came to be common phenomena and thus about 50% of the highland farmers have land holdings in the lowlands. Likewise, Demese (2015) revealed that agro-pastoralism is expanding to the semi-arid lowlands of Ethiopia.

6.1.2 Economic Linkage

The second strongest and widely practiced linkage with a response rate of 516, experienced between the highlanders and lowlanders was found to be economic linkage. Principally because of their biophysical structures, highlands and lowlands are endowed differently regarding resource and production opportunities. This forms the basis for complementary economic link between them (Soini, 2006). This economic linkage is manifested through exchange of agricultural products, timber and non-timber forest products and labor movements. See Table 6.2.

6.1.2.1 Exchange of agricultural products between the highlanders and lowlanders

Although its types and magnitude vary, both the highlanders and lowlanders were engaged in different agricultural activities which broadly categorized as crop cultivation and livestock rearing. In the survey 47.9% and 47.6%, of the sampled respondent revealed their involvement in exchanging of agricultural products of crops and livestock, respectively. When asked further to state the types of agricultural products they traded, the highlanders list of varieties of cereal crops like barely, wheat, peas, beans and maize, and vegetables such as varieties of cabbages, pepper, varieties of onions, carrot, beetroot. In addition, varieties of livestock such as cattle, shoat, donkey, horse and mules were also raised by the highlanders for various purposes like source of draught power, source of income, means of transportation and source of food item. Furthermore, poultry was practiced by the highlanders of the zone. Thus, the highlanders of Bale administrative zone practiced mixed farming like other highlanders of Ethiopia.

On the other hand, when asked to state their agricultural products, the sampled respondents of the lowlands identified that they involved in livestock rearing, plantation agriculture like sugar cane and *chat* cultivation. The commonly reared livestock include cattle, shoats, donkeys and camels. Besides, they currently began to practice poultry and crop cultivation like *teff*, sorghum, millet, and sugar beet as well as oil seeds like sesame.

However, engagement in these agricultural activities alone does not guarantee economic linkage between the highland and lowland communities, unless otherwise there is complementarity and surplus product to be presented to markets. It is this process of buying and selling of surplus products that create an interface of highlanders and lowlanders. To generate such data, both survey and an in-depth interview were employed.

Table 6.3: Estimates of Cultivation by Agro-ecological Region

Produced Crop	Production Estimates by Agro-ecological Zones (Kg/hh/yr)									
	Highland					Lowland				
	Mean	Max.	Min.	Range	Standard Deviation	Mean	Max.	Min.	Range	Standard Deviation
Wheat	587	2300	200	2100	419	99	180	40	140	48
Barely	1740	10000	100	9900	2093	.	.	.	.	.
Maize	160	1000	10	990	212	1478	24000	100	23900	2272
Sorghum	140	200	50	150	82	505	1500	100	1400	357
Teff	.	.	.	.	.	257	1500	50	1450	204
Oil Niger	200	200	200	0	.	200	200	200	0	0
Sesame	.	.	.	.	.	202	1000	100	900	194
Vegetable	2823	40000	30	39970	6060	.	.	.	.	.
Peas	108	200	50	150	49	.	.	.	.	.
Beas	100	150	50	100	32	.	.	.	.	.

Source: Field Survey, 2017.

The survey, result revealed that varieties of cereals, vegetables and oilseeds are produced by the sampled household heads of the two ecological regions. As can be seen from Table 6.3, barely, wheat, oil Niger, vegetables and pulses are dominantly cultivated in the highland agro-ecology of Bale. On the other hand, maize, sorghum, *teff* and sesame are widely produced in the lowlands of the zone. However, some cereals like wheat, maize and sorghum are cultivated in both agro-ecological regions of the zone. This is a predictable outcome, as there is no clear-cut boundary between the two agro-ecological regions in terms of agricultural productions. In general, from this it can be inferred that, as the agricultural productions of the highlanders and lowlanders varies to some extent, exchange of these products is an inevitable. This further increases their complementarity and then strengthens their interactions.

On the other hand, the range and standard deviation of some agricultural outputs like barely (range=9900kg/year/HH, SD=2093) Vegetables (range=39970kg/year/HH, SD=6060kg/year/HH) and wheat (range=2100kg/year/HH, SD=419) is found to be very large for the highlands. This is attributed to the altitude where these sampled highland *woredas* and RKA are located and tendency of barely to grow at an altitude that ranges from 1500 meter to 3700

meter (see Figure 2.1). To be specific, the highland *woreda* of Goba (Rira RKA) is situated at 2904 meter above sea level. In this distinctive altitude, cultivation of barely and vegetation (cabbage) was practiced extensively. Thus, it deviates from the amount of these products in the other highlands of Gololcha *woreda* (Buria RKA) that positioned at 1796 meter above sea level. In the same way, the amount of maize (range=23900kg/year/HH, SD=2272) product in the lowlands has great range and standard deviation. The justification may be the same (altitudinal difference). The altitude where the lowland *woreda* of Sawena (Mandera RKA) and Dello-menna (Chirri RKA) are situated is quite different. That seems why maize is cultivated widely in the wet lowlands of Dello-menna (Chirri RKA) than the dry lowlands of Sewena *woreda* (Mandera RKA). This implied that variation in agro-ecological region determine the types and magnitude of agricultural products which in turn make communities in the two agro-ecological regions to complement each other in exchanging their products.

In addition, the amount produced and utilized for self-consumption and sold as source of income has been analyzed separately.

Table 6.4: Estimates of Agricultural Products Sold by Agro-ecological Zones

Products sold	Products Sold in the Two Agro-ecological Zones (kg/hh/yr)									
	Highland					Lowland				
	Mean	Max.	Min.	Range	Standard Deviation	Mean	Max.	Min.	Range	Standard Deviation
Wheat	273	3000	20	2980	422	50	50	50	0	0
Barely	741	4000	50	3950	980	.	.	.	.	.
Maize	225	300	100	200	96	340	5000	100	4900	547
Sorghum	.	.	.	.	.	211	500	50	450	132
Teff	.	.	.	.	.	133	500	50	450	98
Niger oil	.	.	.	.	.	.	.	.	.	.
Sesame	.	.	.	.	.	205	1000	100	900	204
Vegetables	3468	45000	25	44975	8379	.	.	.	.	.
Peas	68	80	50	30	15	.	.	.	.	.
Beas	62	100	50	50	22	.	.	.	.	.
Other	20	20	20	0	.	.	.	.	.	.

Source: Field Survey, 2017.

As indicated in the survey results of Table 6.4, on average (wheat= 273, barely= 741, vegetables= 3468, peas= 68 and Beas= 62 Kg/year/HH) sampled households of the highlands

brought their surplus agricultural products to local markets. Their customers who purchase their agricultural products are either communities in the same agro-ecological regions, or the lowlanders. However, as communities in the same agro-ecological regions are supposed to cultivate relatively similar products, their leading customers are estimated to be the lowlanders. In the same manner, the lowlanders also, sale some proportions of their agricultural products to their customers. On average they sale (maize= 340 Kg/year/HH, Sesame= 205 Kg/year/HH, sorghum=211 Kg/year/HH, *teff*= 113 Kg/year/HH and wheat= 50 Kg/year/HH) to their highland and lowland customers, but mainly, to the highlanders.

As can be referred from Table 6.5, barely and vegetables, particularly cabbage, are abundantly produced in Rira RKA of Goba *woreda*, while maize is cultivated in Chirri (lowland) and Buria (highland) RKA. Besides, sesame is well cultivated in Chirri RKA of Dello-Menna *woreda*.

Table 6.5: Estimates of Products Sold in Kilogram per Year per Households by RKA

Product Sold	Production at Rural *Kebele* Level (kg/hh/yr)			
	Chiri	Rira	Buria	Mandera
	Mean	Mean	Mean	Mean
Wheat	50	560	160	50
Barely	.	1098	100	.
Maize	359	.	225	205
Sorghum	192	.	.	235
Teff	139	.	.	75
Niger oil	.	.	.	.
Sesame	205	.	.	.
Vegetables	.	5353	286	.
Peas	.	.	68	.
Beas	.	.	62	.
Other	.	.	20	.

Source: Field Survey, 2017.

Moreover, to be more specific about the trading partnership between the highlanders and lowlanders, further question was raised to the sampled respondents to indicate their clients who purchase their agricultural products. Accordingly, the highlanders recognized the lowlanders and households of the same agro-ecological regions as their main customers. This accounts for 24% and 11.7%, respectively, for the highland and lowland trade partners. However, the role played

by middlemen is also critical in facilitating the exchange of products between the two ecological zones. The highlanders verified that about 12% of their purchasing demand is satisfied by the traders. On the other hand, the dominant customers of lowlanders that accounted for about 25% and 10% were from the lowland and highland communities, respectively. Besides, they identified that about 18% of these products were presented to them by the local traders. See Table 6.6 below.

In general, the highlanders as trade partners accounted for about 37% of the crop products brought to market and accessed by the highlanders and lowlanders. On the other hand, the lowlanders and traders accounted for about 34% and 30% of the crop products presented to market. This implied that both the highlanders and lowlanders engaged in transaction of surplus agricultural products, which indicates that the two regions were at the same status of trade partners because complementarity existed between the two communities that instigated interaction in terms of agricultural commodities.

Table 6.6: Dominant Customers of Crop Products by Agro-ecological Zones

	Customers in the two Agro-ecological Zone					
	Highland		Lowland		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Highlanders	40	11.7	85	24.9	125	36.5
Lowlanders	82	24.0	34	9.9	116	33.9
Traders	41	12.0	60	17.5	101	29.6
Total	163	47.7	179	52.3	342	100

Source: Field Survey, 2017.

Furthermore, the sample respondents were requested to specify what types of livestock they purchased after selling their crop products. Accordingly, 34.4% of the sampled respondents indicated that they purchased ox. Others that accounted for 29.2% and 3.6% of them bought cow and camel, respectively. In the survey, it was found that, except camel and horse/mule, both the highlanders and lowlanders purchased all the livestock types listed in Table 6.7. Camels are solely bought by the lowlanders, while horses/mules are exclusively purchased by the highlanders. Regarding the proportions of other livestock purchased by the highlanders and lowlanders, larger proportions of the highlanders indicated that they bought ox, cow, sheep and

hen in their descending order. On the other hand, greater proportion (14.2%) of the lowlanders spent their money on purchasing goats. Hence, it can be inferred that though communities of the two agro-ecological regions engaged both in crop cultivation and livestock rearing, the type and quantity they produced differs. As a result, they are required to exchange their products. These exchanges took place both in crop commodities and livestock resources. This is because the demand for highland products may be for local production activities to produce goods and services that may be locally consumed and exported (Banskota and Sharma, 1999). If the entire production activities are such that they fulfill a highland demand and create no demand in the lowlands, such resource are not considered as contributing to highland-lowland economic linkages. However, if the resources are used for production of goods and services that are in demand in the lowlands, or if the resources have a derived demand in the lowlands it forms basis for economic linkage between the two ecological regions.

Table 6.7: Types of Livestock Purchased in Exchange of Crop Products Sold

Livestock Purchased	Response	Agro- ecological Region (heads of count)					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Ox	Yes	108	30.2	15	4.2	123	34.4
	No	69	19.3	166	46.4	235	65.6
Cow	Yes	85	23.7	19	5.3	104	29.1
	No	92	25.7	162	45.3	254	70.9
Camel	Yes	0	0.0	13	3.6	13	3.6
	No	177	49.4	168	46.9	345	96.4
Goat	Yes	13	3.6	51	14.2	64	17.9
	No	164	45.8	130	36.3	294	82.1
Sheep	Yes	26	7.3	5	1.4	31	8.7
	No	151	42.2	176	49.2	327	91.3
Donkey	Yes	10	2.8	13	3.6	23	6.4
	No	167	46.6	168	46.9	335	93.6
Horse/Mule	Yes	20	5.6	0	0.0	20	5.6
	No	157	43.9	181	50.6	338	94.4
Hen	Yes	10	2.8	3	0.8	13	3.6
	No	167	46.6	178	49.7	345	96.4

Source: Field Survey, 2017.

In analyzing economic linkage between the highlanders and lowlanders, independent t-test was employed to compare mean income obtained from various sources to pursue their livelihoods. Accordingly, mean income obtained from crop cultivation, non/off farm activities and livestock keeping were compared between the highlanders and lowlanders.

Table 6.8: Comparison of HHs' Income Obtained from Various Sources

Group Statistics					
Incomes Obtained from	Agro-ecological Region	N	Mean	Std. Deviation	Std. Error Mean
Crops Production	Highland	202	4125.59	6954.261	489.300
	Lowland	201	1144.47	2733.223	192.786
Non/off Farm Activities	Highland	202	2055.39	8609.999	605.797
	Lowland	201	6435.02	9177.595	647.337
Livestock Rearing	Highland	202	5450.71	8834.383	621.585
	Lowland	201	6552.23	7685.982	542.127

Source: Field Survey, 2017

As can be seen from Table 6.8 independent t-test statistics was employed to compare the mean income of highlanders and lowlanders they obtained from various sources. 201 highlanders and 201 lowlanders were included in the analysis for all income sources. Accordingly, the highlanders obtained mean income of 4125 ETB, 2055ETB and 5450ETB from crop production, non/off farm activities and livestock keeping, respectively. The lowlanders obtained mean income of 1144ETB, 6435ETB and 6552ETB from crop cultivation, non/off farm activities and livestock rearing, respectively.

In comparing income obtained from crop production, the Levene's test showed that unequal variance is assumed as p= .001, which is much more less than .05 (See Appendix VI). Likewise in comparing the mean income of highlanders and lowlanders obtained from non/off farm activities the assumption of equal variance was violated as p=.002 is less than .05. Hence the levene's test is significant for such income sources. However, in comparing the mean income obtained from livestock keeping the assumption of equal variance is met. From this it can be inferred that mean income of highlanders and lowlanders obtained from crop production and non/off farm activities have variations. Highlanders obtained higher mean income from crop production to the lowlanders. Conversely, the lowlanders obtained higher mean income from non/off farm activities to the highlanders. This can be attributed to involvement of the

lowlanders in various non/off farm activities as a means of livelihood diversification. On the other hand, it was found that the mean income obtained from livestock keeping do not have significant difference as p=.76 which is greater than .05. This implies that the highlanders make equal mean income as lowlanders. This can be attributed to large possession of livestock by highlanders as a means of production. In the study an attempt was made to triangulate findings of the survey with other instruments like in-depth interview and FGD. Accordingly, key informants interview made in Sawena *woreda* found out that the lowlanders of Mandera RKA sale *chat* in the exchange of coffee. Moreover, the lowlanders in the locality sale cattle like cows and goats to the neighboring highlanders. In return, they buy wheat, maize, vegetables and spices. Similarly, interview made in Gololcha *woreda* with key informant (agriculture office expert) identified that the highlanders of Buria RKA sale various farm out puts to the lowlanders in Mandera RKA and; in exchange they buy cows and goats, but not oxen, as they believe that highland oxen are preferable for plowing. In all these endeavors of exchange, the market centers that interface the two communities are Micha and Jarra towns, located in Sawena and Gololcha *woredas*, respectively. However, these communities of the highlands and lowlands were interacting through the traditional mode of transportation as there is no motorable road that connects them.

Plate 6.2: Coffee Fields in Gololcha (Buria RKA**)**

Source: Bale Zone Administration, 2017

Plate 6.3: Chat Field in Sawena Mandera RKA)

Source: Own Observation, 2017

On the other corner of the linkage between Dello-Menna and Goba *woredas*, agricultural products that created platform for economic linkage between the highlanders and lowlanders were identified by the key informants in the respective RKAs include vegetables like cabbage, potatoes, onion (*adangale*), sugar beets; fruits like mango, avocado, banana, papaya; and cereals like maize, oil seeds, sesame and plantation agriculture like sugar cane. As the flow direction of these products, most vegetables like cabbages, potatoes and onions are traded from the highlands (Goba *woreda*) to the lowlands (Dello-Menna *woreda*). Conversely, all fruits, sugar beets, maize, sugar cane and sesame are traded from Dello-Menna to Goba *woredas*. In the interview made with such key informants, it was justified that though cereals like wheat and barley are cultivated in Rira RKA, they were not traded to the lowlands as they were exclusively utilized for home purposes. Local market centers for such exchanges are Goba and Menna towns. However, sesame was traded in the international market. Thus linkage started at household level can grow to community level and further regional and international level. Such advanced linkages were observed in coffee and sesame products of the lowlanders in Bale administrative zone.

Plate 6.4: Harvested Cabbage in Goba

Source: Own Observation, 2017

Plate 6.5: Harvested Sesame in Dello-Menna

Source: Bale Zone Administrative Office, 2017

6.1.2.2 Exchange of Forest Products between the Highlanders and Lowlanders

The other type economic linkage witnessed by 5.5% of the surveyed household heads was manifested by exchange of forest products. Such linkage is usually demonstrated through an exchange of fire woods, charcoal, timber, construction woods, honey and forest coffee. Although discussion question was presented to the key informants of Sawena and Dello-Menna *woredas*,

nobody dare to articulate the utilization of forest for charcoal and timber purposes. Nevertheless, observations made in the markets of Micha and Manna towns exposed the use of forest timber for such drives. On the other hand, informants in Rira RKA verified the use of forest for timber legally and fire woods selectively. Moreover, such informant did not deny the usage of forest for construction purpose, but not as a product for exchange. The other important forest products identified by the informants were honey and forest coffee. Though its quantity and quality vary, honey as a forest product was harvested in both agro-ecological regions. However, field observations made in the markets of Menna and Micha confirmed that honey was traded from the lowlands to the highlands. Despite this fact, honey was harvested well in Rira RKA and sold along the route to Goba. On the other hand, coffee was harvested well in Dello-Menna *woreda* and traded, locally in the highlands and internationally by the brand of Hararghe coffee.

Plate 6.7: Honey Products of Goba (Rira)

Source: Own Observation, 2017

Plate 6.6: Honey Products of Dello-Menna

Source: Bale Zone Administration Office, 2017

From such discussions, it is possible to conclude that the forest products played a role in interfacing communities in the highlands and lowlands. All the interfacing centers for such products like charcoal, honey and coffee were situated at the source regions, lowlands. Hence, unlike the agricultural products, the flow of forest products appeared unidirectional.

6.1.2.3 Labor Movements between the highlands and Lowlands

The seasonal movement of labor between the highlands and lowlands in search of job opportunity is the other indicator of economic interaction between communities of these agro-ecological regions. According to (Banskota and Sharma (1999) the linkage resulted from such migration has two aspects, and these are related to the outflow of manpower and the inflow of remittances. As can be seen from Table 6.2, 12.2% of the sample respondents confirmed the existence of out-and in-migration based interaction. In the key informant interview held in Dello-Menna and Goba *woredas,* it was found that large number of youths migrated from the highlands to the lowlands of Dello-Menna *woreda,* primarily for economic reasons. When asked about why of such movements, was reported because of the availability of temporal works for preparing (clearing and digging hole) land for coffee plantation and coffee harvest. Coffee harvest usually took place in the months of July and August. Such temporal labor works were mostly practiced during the off-farm and non-farm seasons in the highlands. Conversely, large proportion of labor migrated temporally from the lowlands of Bale administrative zone to the highlands so as to involve in crop harvest on contractual basis. Similarly, this took place during the off-farm and non-farm seasons in the lowlands. Hence, the highlanders and lowlanders interact in their effort to look for job opportunities. The interaction was identified to be two directional. However, this conclusion is against the findings of Jodha (2002) and Banskota and Sharma (1999), which found the flow direction of labor was one directional, i.e. from highlands to lowlands. Such discrepancy may rise due to differences in the geographical contexts of the study areas. In Asian countries where such studies made, the lowlands are more accessible and center of socio-economic development and the reverse holds true in Ethiopia.

6.1.3 Socio-cultural Linkage

The highland and lowland communities of Bale zone have extensive socio-cultural interactions. In the survey, about 760 responses were counted for witnessing the commonness of socio-cultural linkages. It is manifested through interactions made for different purposes like to visit relatives and friends, to participate in social affairs, to attend education and to look for health services.

6.1.3.1 Visits of Relatives and Friends in the Neighboring Agro-Ecological Zone

The survey result showed that the overwhelming majority (85.7%) of the sampled respondents interacted with their neighboring agro-ecological communities for the purpose of visiting their relatives and friends. This was expedited by cultural homogeneity of the adjoining communities. As indicated on Table 3.6, about 94% and 93% of the highlanders and lowlanders respectively were Oromos. In terms of religion 75.4% and 95.1% of the highlanders and lowlanders, respectively were followers of Islam. This creates an ideal platform for social interaction between communities of the two agro-ecologies.

Results of FGDs made in the four study sites strengthen the above outcomes in that they established friendship (*jalumma*[8]) with members of households in difference agro-ecology intentionally. The rationale they raised is facilitating access to water points and pasture grounds for their livestock in their seasonal movements to each other's agro-ecology. However, such friendship was established regardless of ethnic and religious affiliations. They mentioned that marriage (*soddumma*[9]) is the other strategy to hit such targets. This was realized through getting married with woman from the two agro-ecologies (polygamy). In this regard, it is worth noting to cite the research results of Flintan et al. (2008) in Bale administrative zone, Dello-Menna *woreda*.

> It is relatively common for a man to have several wives. Not only is this a reflection of social traditions but it also shows an optimum use of the ecological environment of the area, where wives are split across different ecological zones, undertaking different livelihood system (Flintan et al., 2008: 122).

From the above statements, it is possible to conclude that, socio-cultural interaction based on friendship and marriage further reinforces the relationship between the highlanders and lowlanders.

6.1.3.2 Highlanders and Lowlanders Participation in Social Affairs

In the survey, it was identified that participation in different social affairs also created a helpful platform for the socio-cultural linkages of the highlanders and lowlanders (71.3%). Both the

[8] Being best-man
[9] Being son in law

highlanders and lowlanders of Bale are rich in cultural affairs like wedding, mourning, festivals and negotiation (*jarsumma*[10]). As indicated in the above discussion, the two communities (the highlanders and lowlanders) have various commonly shared cultural practices. Hence, intermarriage is unrestricted between them as long as all the cultural requirements are satisfied. Participants of FGD in all the study sites witnessed the prevalence of such marriage occasions between the highlanders and lowlanders. This helps to establish a strong socio-cultural linkage that is considered as guarantee of risk times like drought, famine and conflict. So, it is evident that, once these communities are tied up through these social affairs, it would be an inevitable to participate in other social matters like mourning, wedding and *jarsumma*.

Moreover, key informant interview held with experts in Golocha *woreda* indicated that the highland and lowland communities of Bale have numerous festivals celebrated together. A typical example is the *haji* and *zahara* festivity in the corresponding moths of January, February and October in *Dirre- Shek-Hussien* (Gololcha *woreda*). Numerous people take part in this celebration twice a year. Participants come from different agro-ecological zones including the adjacent lowlands of Sawena *woreda*. Furthermore, the highlanders and lowlander work together to settle disputes between them. Basically this involves elders from both communities. In case there is loss of life or huge property, other members of the kinship were requested to participate either financially or in kind. Such contributions were utilized for *guma*[11].

Therefore, strong socio-cultural linkage is a big social capital that can be exploited during hard times. And this is true between the highland and lowland communities of Bale administrative zone.

6.1.4 Political Linkage

This type of linkage is manifested through institutional support provided by the government at different levels for the benefits of the highland or lowland communities based on their natural comparative advantages. In this regard, various institutions were established in the highland and lowlands of the zone just like other part of the nation. In the highlands, the institutions that work on natural resources management, agricultural sector, trade, tourism, social services and infrastructure provision are well structured. Similar institutions were found in the lowlands

[10] Council of elders
[11] *Guma* is a negotiation system where by reparation is given to the offendant

though their service provision efficiency was found poor for several years. But currently, lowland specific institutions were established by the government of Ethiopia. If such organizations perform well the duty given to them, they can increase the magnitude of flows of various resources to that facilitate linkage between the highlands and lowlands. Particularly, fair social transfer and public sector investment flow plays a role in this regard. Jodha (2002) stated that development projects in either of the two ecological regions need to be free of bias in terms design and mechanisms of implementation.

However, the current administrative structure of the country could not encourage horizontal linkage between the administrative *woredas* of the administrative zone. It rather, encourages vertical linkage between *woredas* and zone. This in turn, eroded the efforts made to link different *woredas* of the administrative zone through road connectivity, market and social connectivity.

6.1.5 Social Service Linkage

In the survey, it was found that 13.1% and 61.6% of the sampled respondents witnessed their interaction was due to getting advanced educational and health services, respectively (refer Table 6.2). This survey result was also ascertained by participants of the FGDs made in the two study sites, i.e Sawena and Dello-Menna *woredas*. Participants in Sawena *woreda* specified that though secondary school and health center were built recently in the *woreda* capital, Micha town, they still travel to the highlands of the administrative zone so as to get advanced education and health services. For such purposes, they were required to visit their distant neighbor found at Ginnir town as there is no road that connects them to the nearby by Jarra town. They then passed to Robe and Goba towns for further services. Likewise, participants of FGD in Dello-Menna *woreda* affirmed that, though primary level hospital was established in the *woreda* recently, they continued to visit Goba referral hospital for advanced treatments. From this, it can be inferred that communities in the highlands and lowlands are in continuous interactions mainly due the development of such service delivering facilities in the highlands of the administrative zone.

6.2 Nature of Highland-lowland Linkage

Under this subsection an attempt was made to examine the nature of highland-lowland linkages. The nature of linkages between the highlanders and lowlanders was approached through examining the movement directions of two the communities to get access to these interfacing resources and services.

As demonstrated in Figure 6.1, in order to get access to the aforementioned interfacing resources, communities in the highlands and lowlands of the zone move from one agro-ecological region to the other. Regarding water resource, as the highlands are source regions, it is the burden of the lowlanders to move to the source regions, temporally. The other interfacing resources are grass and arable land, where by both communities move to each other's agro-ecological regions seasonally. Crop residue found abundantly in the farm fields of the highlanders was also demanded by the lowlanders in the dry season. Thus, they move to the highlands with their cattle seasonally. On the other hand the highlanders that demanded *hora* and *haya* commute to the lowlands with their cattle rarely. In the same way Belete and Aynalem (2017) revealed that households move further distance to reach the mineral licks (*haya*) though its access was obstructed by farm encroachment and in some cases the *haya* itself was ploughed.

Interface resources and services	Movement Direction of the Communities by Agro-ecological Region	
	Highland	Lowland
Water (unidirectional)	←	
Grass (two ways)	←	→
Crop Residue (one way)	←	
Arable Land (two ways)	←	→
Hora/Haya (one way)	→	
Markets (two ways)	→	←
Social Affairs (two ways)	←	→
Educational Services (one way)	←	
Health Services (one way)	←	
Court Service (one way)	←	

Figure 6.1: Equilibrium of Interfacing Resources and Service by Agro-ecological Regions

Source: Field Survey, 2017.

Moreover, markets are important platforms for the interaction of the highlanders and lowlanders. As indicated in the former discussion (Section 6.1.1) agricultural products flow from one ecological region to the other based on abundance of production and demand for the products.

Hence the flow direction was found to be two directional as the production potentials of the two agro-ecologies is different. Some agricultural outputs were transported from the highlands to the lowlands, while the others flow in the opposite direction. For instance, agricultural products like cereals and vegetables dominantly flow from highlands to the lowlands. Other products like horticultural products and forest products (fire woods, charcoal, honey and coffee) flow in the opposite direction from the lowlands to the highlands. This is in agreement with the findings of Soini (2006) that stated the highlands provide large quantities of vegetables to the lowlands. While it is opposite to the findings of the current study in notifying that the highlands supply large amounts of horticultural products to the lowlanders in east Africa (Kenya). Although it is not explicit, this may be attributed to some highland specific fruits like apple, which is also currently introduced in the highlands of Ethiopia.

Likewise, livestock and livestock products principally transported from the lowlands to the highlands. This outcome is in line with Workneh (2011) findings. Besides, though its volume of flow was found to be high from the highlands to the lowlands, labor movement is also two-directional economic movement in the study area.

On the other hand, commuting for social concerns, which was the largest interfacing aspects, was found to be two directional. However, movements to get access to advanced social services were found to be unidirectional. This is due the high concentration of such services (referral hospital, college and university education, higher court) in the highland agro-ecology.

In general, scholars have differed in their arguments regarding the equilibrium of interdependency between the highlanders and lowlanders. However, the findings of this study indicated that the flow of resources in the study area were found to be two directional. Thus, it is in contrast with the findings of Kiteme et al. (1998) and Yanda (2003) who both concluded that the balance of highland-lowland interdependency was skewed to one side. These authors specified that the highlands are the source areas while the lowlands are the recipient of resources. For these scholars the interaction is helpful to transfer resources (natural) from highlands to the neighboring low potential lowland regions. Thus, their interaction is unidirectional. However, the conclusion of the this study is in agreement with findings of Jodha (2002), which observed the highlands and lowlands have differing potential for production and thus, the interdependency is

important to complement each other's productions. Hence, these scholars, the lowlands are not only receivers of resources, products, and services but also suppliers of resources, products and services in varied forms. They further stated that the position of highlands as a trade partner of lowlands is weak. However, this is in contradiction with the finding of the current study as large volume of resources, products and services are transported from the highlands to the lowlands of the administrative zone (refer Figure 6.1). This in turn is supported in the findings of Workneh (2011) which concluded that the economic interaction between the highlanders and lowlanders benefited both parties, however more specifically, the less favored lowlanders as it enables them to get access to various social services. This implied that the lowlanders, who are less developed in all aspects, are recipients of most social services.

6.3 Extent of Highland-lowland Linkage

To examine the magnitude of highland-lowland linkages, different approaches were employed. In the first place, an attempt was made to assess the frequency of visits made to one another's agro-ecological regions. To this end, the 321 sampled respondents who had commuting experience were requested to specify the regularity of their visit.

Table 6.9: Frequency of Visit Made to Each Other's Agro-ecological Regions

Frequency of Visit	Agro-ecological Zone					
	Highland		Lowland		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Daily	1	0.3	4	1.2	5	1.6
Weekly	12	3.7	2	0.6	14	4.4
Monthly	18	5.6	10	3.1	28	8.7
Quarterly	79	24.6	19	5.9	98	30.5
Annually	60	18.7	116	36.1	176	54.8
Total	170	52.9	151	46.9	321	100

Source: Field Survey, 2017.

The survey result in Table 6.9 illustrated that the regularity of the visits made to the other agro-ecological zone ranges from daily basis to annual (54.8%). The daily visit was made by insignificant proportions of the respondents (1.6%). Such everyday visits were attributed to the location of farm plots or grazing fields in the territories of others' agro-ecological regions. The

remaining 30.5% and 54.8% of the sampled respondents visited other agro-ecological regions on a quarterly and annual basis, respectively. This type of visit may be attributed to social, ecological and economic drives. Therefore, this gives an insight to the nature and extent of linkages between the highlanders and lowlanders.

Moreover, in the survey, an attempt was made to assess the views of all sampled respondents about the magnitude of the linkage between them. Accordingly, they were requested to rate the level of the linkage as very strong, strong, very weak, weak and no linkage at all.

Table 6.10: Rate of Highland-Lowland Linkage by Agro-ecological Regions

	Rate	Agro-ecological Region					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
How do you rate the strength of Highland-Lowland Linkage	Very Strong	12	3.0	22	5.5	34	8.4
	Strong	39	9.7	126	31.2	165	40.9
	No Linkage	3	0.7	8	2.0	11	2.7
	Weak	140	34.7	29	7.2	169	41.9
	Very Weak	8	2.0	16	4.0	24	6.0
Total		202	50.1	201	49.9	403	100

Source: Field Survey, 2017.

As can be seen from Table 6.10, the sampled respondents have different views regarding the strength of the linkages. While 40.9% of the sampled respondents perceived that the linkage is strong, almost with an equal proportion of 41.9% they noticed that the linkage is weak. Other respondents that account for 8.4% and 6% sensed that the linkage is very strong and very weak, respectively. The remaining 2.7% of them denied occurrence of linkage between the highlanders and lowlanders. Hence, about half (50%) of the sampled respondents are not satisfied with the existing status of interaction. Moreover, in the survey it was found that, while the majority of the highlanders (34.7%) viewed the status of linkage as weak, significant proportion (31.2%) of the lowlanders viewed it strong. This controversial view of the highlanders and lowlanders may attribute to the frequency of visit they made to each other's agro-ecological region and consequential benefit obtained as demanded. Hence, the lowlanders may sense the linkage is strong, as they frequently move to the highlands to share ecological resources like water and crop

residues as well as to get better social services like referral hospital (Goba), higher courts (Robe) and higher education institutions (Madda Walabu University, Robe).

Though the above approach gives some insight to the magnitude of highland-lowland linkage, so as to get full picture of the magnitude another approach was taken into consideration. In this approach, the existing linkages can be categorized as strong and weak based on the calculated linkage index (Mewael, 2016).

The index was developed from the frequency of visits made to each other's agro-ecological regions. Thus, the ecological, economic and socio-cultural linkages of the highlanders and lowlanders were measured in an index developed from the frequency of visit made for such purposes. Hence, the household heads were requested to respond for the prevalence of ecological links by saying yes or no for the presented four indicators. These are visits made for pasture, water, arable land and forest. Likewise, visits made for economic drives like exchange of crops (cereals, fruits, oil seeds and vegetables), livestock and its product, forest product (charcoal, firewood, timber and construction woods), honey and labor. In the same way linkage created for socio-cultural purposes like visiting relatives or friends, participating in social affairs (wedding, funeral and festivals like *Dirre-Sheki Hussen*), looking for education and health services. Accordingly, value of 1 is given for visits made for one purpose, and 0 is given if no visits were made for the listed purposes (Mewael, 2016). Thus, the maximum and minimum frequency of visit made for ecological and socio-cultural purposes were found to be four and zero, respectively. Likewise, the maximum and minimum frequency of visit made for economic drives are found to be five and zero, respectively. Thus, higher the frequency of the visit, the greater will be the spatial interaction between the highlanders and lowlanders.

Table 6.11 Magnitude of Highland-Lowland Linkage

Types of Linkage	Linkage Index	Agro- ecological Region		
		Highland	Lowland	Total
		Count	Count	Count
Ecological Linkage	Weak	137 (41.6)	151 (45.9)	288 (87.5)
	Strong	36 (10.9)	5 (1.5)	41 (12.5)
Economic linkage	Weak	60 (18.3)	137 (41.8)	197 (60.1)
	Strong	114 (34.8)	17 (5.2)	131 (39.9)
Socio-cultural Linkage	Weak	30 (9.1)	122 (37.2)	152 (46.3)
	Strong	144 (43.9)	32 (9.8)	176 (53.7)

Source: Field Survey, 2017.

As can be seen from Table 6.11, 87.5%, 60.1% and 46.3% of the sampled household heads indicated that ecological, economic and socio-cultural linkages between the highlanders and lowlanders are weak. Thus, as compared to the others, socio-cultural linkage was in a good status.

Moreover, an independent t-test was employed to compare the mean income of highlanders and lowlanders obtained from all sources of income.

Table 6.12 Mean Income of Highlanders and Lowlanders

	Agro-ecological region	N	Mean	Std. Deviation	Std. Error Mean
Total Household Income Obtained from Agriculture and Non-Agriculture Based Livelihoods	Highland	157	14749.5541	19232.323	1534.906
	Lowland	151	17928.8079	14320.729	1165.404

Source: Field Survey, 2017

As can be seen from the t-test table (Table 6.12), 157 highlanders and 151 lowlanders were included in the analysis. The highlanders obtained mean income of 14,749 ETB with standard deviation of 19232 and the lowlanders obtained mean income of 17,928ETB with standard error of 14320.

The levene's test is not significant (because p=.198, which is greater than .05) and then the assumption of homogeneity of variance is met (See Appendix V). The two tailed value of p is .102 which is greater than .05. Hence it implies that there is no significant difference in the mean income of the highlanders and lowlanders. The highlanders make equal income as the lowlanders. The one tailed probability (.012/2= .051) which is still greater than .05, implying that there is no significant difference in the mean income of highlanders and lowlanders.

Therefore, the magnitude of highland-lowland linkage that was inferred from these ecological resource sharing tradition, agricultural product exchange and engagement in socio-cultural affairs indicated that status of the linkage is not to the level expected. This can be attributed to continuously depleting ecological resources, inadequacy of agricultural products and gradual development of resentments between various socio-cultural groups in Bale administrative zone.

6.4 Conclusion

The reality of strong ecological linkage between the highlanders and lowlanders is determined by natural resource endowment differentials and existence of complementarity between them. Hence, it was found that the highlanders and lowlanders of the zone are gifted with different resources bases. The principal ecological and natural capitals include water, grazing land, forest and arable land. Although all these resources are available in the two agro-ecological zones, their magnitude varies. On the other hand, the presence of robust highland-lowland linkage required product differentials between the two ecological zones. The result of one way ANOVA also confirmed the presence of mean household income variations between communities of the highland and lowland. This in turn creates demand for the products of one another's ecological region. Hence, this is considered as the basic principle for the formation of strong economic linkage between these ecological regions. Unlike the ecological and economic linkages, socio-cultural linkage requisites resemblance of the socio-cultural features likes cultural, language, ethnic and religious similarities. Accordingly, it was found that the overwhelming majority of communities in the two agro-ecological regions have commonly shared cultural values that contribute for strong socio-economic interaction between them.

In addition, these ecological, economic, socio-cultural and political linkages are found to be two directional. Because some ecological resources like grazing land, arable land and mineral water necessitated the highlanders to move to the lowlands. Conversely, other ecological resources like

water, crop residues and farming land make the lowlanders to move to the highlands. On the other hand, farm products like cereals and vegetable are transported from highlands to the lowlands, while other products like fruits, coffee, honey, oilseeds and livestock transported from the lowlands to highlands. Livestock and its products, coffee, oilseeds of the zone were also presented to the international markets. Thus, market plays significant role in creating platform for the interaction of the highlanders and lowlanders. Advanced services like college and university education, referral hospital and higher courts necessitated the lowlands to commute to the highlands as they were concentrated there. Regarding the magnitude of linkage between them, it was found that the interaction is not to the level expected due to the impact of some obstructing factors.

CHAPTER SEVEN

FACTORS INFLUENCING THE HIGHLAND-LOWLAND LINKAGES

In this chapter, factors that facilitate or obstruct highland-lowland linkages in the study area are presented.

From the previous discussion, it was found that about 48% of the sample respondents indicated that the status of highland-lowland linkage is weak. The other which accounted for about 3% denied the existence of highland and lowland linkages. See Table 6.9. These respondents were further requested to identify factors responsible for such fragile or non-existent linkage. Accordingly, they identified out a list of factors such as poor road connectivity and transportation services, lack of market, lack of surplus product, poor administrative structure, lack of cooperation on the use of communal resources, and degradation of the existing communal resources. See Table 7.1.

Table 7.1: Factors Affecting Highland-Lowland Linkage by Agro-ecological Regions

Obstructing Factors	Response	Agro-ecological Regions					
		Highland		Lowland		Total	
		Frequency	%	Frequency	%	Frequency	%
Lack of transportation services	Yes	116	67.4	41	23.8	157	91.3
	No	13	7.6	2	1.2	15	8.7
Lack of road connectivity	Yes	89	51.7	10	5.8	99	57.6
	No	40	23.3	33	19.2	73	42.4
Lack of market	Yes	69	40.1	1	0.6	70	40.7
	No	60	34.9	42	24.4	102	59.3
Lack of surplus product	Yes	76	44.2	0	0.0	76	44.2
	No	53	30.8	43	25.0	96	55.8
Absence of kinship ties	Yes	35	20.3	9	5.2	44	25.6
	No	94	54.7	34	19.8	128	74.4
Language barrier	Yes	12	7.0	1	0.6	13	7.6
	No	117	68.0	42	24.4	159	92.4
Cultural difference	Yes	10	5.8	1	0.6	11	6.4
	No	119	69.2	42	24.4	161	93.6
Ethnic animosity	Yes	28	16.3	0	0.0	28	16.3
	No	101	58.7	43	25.0	144	83.7
Poor administrative structure	Yes	108	62.8	1	0.6	109	63.4
	No	21	12.2	42	24.4	63	36.6
Lack of cooperation on the use of communal resources	Yes	77	44.8	4	2.3	81	47.1
	No	52	30.2	39	22.7	91	52.9
Degradation of the existing communal resources	Yes	88	51.2	4	2.3	92	53.5
	No	41	23.8	39	22.7	80	46.5

Source: Field Survey, 2017.

All these factors are categorized into three for seek of convenience as limited accessibility, resource and product insufficiency and socio-cultural and institutional factors.

7.1 Limited Accessibility

In this sub-section highland and lowland linkages obstructing factors which are related with limited accessibility were presented.

7.1.1 Limited Accessibility to Road

As can be seen from Table 7.1, 91.3% and 57.6% of the sampled respondents complained poor transportation service and road connectivity, respectively, as factors limiting their interaction with the adjacent agro-ecological communities. This survey result was proved through the field visits made during data collection. In this journey, it was recognized that there is 170-kilometer long gravel road that connects Goba *woreda* (Goba town) and Dello-menna *woreda* (Dello-Menna town). The road passes through a rugged and peaked topography of the *Sannate* plateau and dense forests of Goba and Harena Buluk *woredas*. Due to lack of upgrading and maintenance work, the road is found in poor condition. As a result, transport vehicles that drive on this route are limited in number as the poor state of the road costs their time and money due to frequent maintenance cost. On the other hand, though the road condition is poor, some vehicles give services at the expense of the passengers by incurring additional cost of transportation.

On the other portion of the study area, there is no motorable road that connects the neighboring *woredas* of Gololcha and Sawena. As can be seen from Figure 3.1, though the *woredas* are adjacent to each other, they are forced to interact through the route of Ginnir *woreda*. Both the highland and lowland communities of Gololcha and Sawena *woreda* travel to each other for socio-economic purposes through Ginnir *woreda* if they intend to use modern means of transportation. This in turn, costs their time and money.

Moreover, interaction through modern means of transportation between the adjacent RKA of the highlanders and lowlanders is unthinkable as there is no road that connects them. Though outcomes of Universal Rural Road Access Program (URRAP) are encouraging in interlinking RKA with the *woreda* capital, no attention was given to interconnect the neighboring RKA, which are expected to share and exchange various resources and products. This is true in all the sampled study sites i.e. Chirri to Rira and Mandera to Buria. This in turn, weakens economic and socio-cultural interaction of communities in the two agro-ecological regions. However, it does

not entirely break their interaction, as they endure to interact through traditional means of transportation like pack animals and on foot journey. This is in line with the findings of others which state that investments in connective infrastructure are facilitating the movement of ideas, technologies, goods and services, and labor to areas that demand specific products and distribute other outputs. Thus, improving and restoring primary road infrastructure supports secondary and primary market interactions. Maintaining and constructing rural roads that connect agricultural surplus areas with small towns and urban centers also encourage comprehensive geographic supply and demand networks (Chamberlin and Schmidt, 2011).

Moreover, the all-weather road density (0.021km/km^2) of the study area was found to be low in comparison to the national standard. This inevitably constrains the connectivity and interaction of the highlanders and lowlanders.

7.1.2 Limited Accessibility to Market

The other obstructing factor of highland-lowland linkage is poor access to market. In the survey, it was found that 40.7% (refer Table 7.1) of the sampled respondents complained lack of access to market as major factor that limited their interaction with the adjoining agro-ecological communities. This is attributed to either lack of demand for local products or lack of surplus products to be exchanged at market. As Jodha (2002) explained having diversities of resource base as a source of spatially and temporally different production opportunities may contribute for linkage if properly harnessed and traded. This is reflected in the type and quantity of agricultural products of the highlanders and lowlanders (refer Tables 6.3, 6.4, 6.5 and 6.7). In principle, the higher the quantity of production, the greater the surplus to be presented to market; and the greater the variation in types of products, the higher the demand for each other's product, which in turn boosts exchange of agricultural commodities. Thus, from the above Tables, it can be inferred that there is slight difference in the types of agricultural products (crop cultivation and livestock rearing) between the highlanders and lowlanders. But this alone does not guarantee linkage, unless there is surplus product to be sold in the market. Therefore, availability of market is one of the determinant features of economic linkage.

In addition, an attempt was made to examine variation of products in the two agro-ecological zones and income obtained from the products. To this effect, one way analysis of variance (one way ANOVA) was employed to compare mean income of communities in the two agro-ecological regions (highland and lowland); and to identify variables with significant differences at RKA level and to compare average income obtained from agricultural products among the RKAs drawn from highlands and lowlands. The data was first tested for normal distribution using various approaches like calculating mean, mode, median, skewness and kurtosis as well as plotting graphs and K-S and Shapiro' test for normality. Moreover, Levine's test of homogeneity of the variance was made.

In the analysis, household income was selected as dependent variable and the explanatory variables (Xi) include the four sampled study RKAs from the highland and lowland agro-ecological regions (1= Chirri, 2= Rira, 3= Mendera and 4= Buria) of different sources of household income into factor variable using Hochberg's GT2 method in post hoc procedure.

Accordingly, the Levine's test of homogeneity of variance shows that the variances are significantly different at about significance level of 0.00 which is much lower than the p-value < 0.05. Thus the assumption that states, there is no significant difference in the mean income of the groups is violated. Likewise, the result for robust test of equality of means proved the homogeneity of variance has been met. Moreover, the output of ANOVA examination verified that the model is significant at 0.05 levels of significances. This implied that at least an average income of one RKA is different from others' (refer Table 7.2, 7.3 and 7.4).

Table 7.2: Test of Homogeneity of Variances

Household Income

Levine Statistic	df1	df2	Sig.
35.287	3	303	.000

Table 7.3: Robust Tests of Equality of Means

Household Income

	Statistic[a]	df1	df2	Sig.
Brown-Forsythe	15.545	3	70.628	.000

a. Asymptotically F distributed.

Table 7.4: ANOVA Test

Households Income

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	6277904089.875	3	2092634696.625	29.365	.000
Within Groups	21592663169.937	303	71262914.752		
Total	27870567259.811	306			

Source: Field Survey, 2017.

Moreover, the Post Hock multiple comparison approach of Hochberg's GT2 was employed as there is no hypothesis to be tested and the sample size of the groups greatly differs. The result showed that four groups compared are significantly different. As indicated in Table 6.13, it is marked with (*) symbol. Hence, the average household income of Chirri (lowland) RKA is significantly differs from that of Rira (highland) RKA. However, the mean income of households in this RKA is less than Rira and Mandera. Likewise, the household income of Rira RKA shows significant difference from other two RKA (Buria and Mandera) at $P < 0.05$ and greater than the average income of households in in the three RKAs (Chirri, Buria and Mandera). Similarly, the average household income of Buria (highland) RKA significantly differs from that of Mandera (lowland) RKA at $P < 0.05$, but less than the mean income of all the three RKA (Rira, Chirri and Mandera). And the average household income of Mandera is greater than Chirri and less than the two (Rira and Buria) at $P < 0.05$ levels of significances. Hence, it can be concluded that the average income of households in the three RKAs are significantly different at $P < 0.05$ level of significance, which imply that the agricultural products of communities in the two agro-ecological regions are different in a way that encourages market linkage between them. Undoubtedly this creates opportunity for highland-lowland linkage.

Table 7.5: Multiple Comparisons Outputs of ANOVA by Hochberg Method

Dependent Variable: Household Income

(I) RKAs	(J) RKAs	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Chirri	Rira	-11617.813*	1581.368	.000	-15804.62	-7431.00
	Buria	2741.188	1083.305	.069	-126.96	5609.33
	Mandera	-4539.566	1792.782	.069	-9286.11	206.98
Rira	Chirri	11617.813*	1581.368	.000	7431.00	15804.62
	Buria	14359.001*	1588.985	.000	10152.03	18565.98
	Mandera	7078.246*	2136.678	.006	1421.21	12735.29
Buria	Chirri	-2741.188	1083.305	.069	-5609.33	126.96
	Rira	-14359.001*	1588.985	.000	-18565.98	-10152.03
	Mandera	-7280.754*	1799.504	.000	-12045.10	-2516.41
Mandera	Chirri	4539.566	1792.782	.069	-206.98	9286.11
	Rira	-7078.246*	2136.678	.006	-12735.29	-1421.21
	Buria	7280.754*	1799.504	.000	2516.41	12045.10

*. The mean difference is significant at the 0.05 level.

Source: Field Survey 2017.

In general, it is possible to conclude that, though there is a significant product differential between the highlanders and lowlanders that encourage market linkage between them, infrastructure that facilitate their access to market was found to be the big challenge in Bale administrative zone. This is also indicated in the findings of Workneh (2011) that the lowlands of Ethiopia are important source of cattle for national and international market though market is their major constraint.

7.2 Resource and Product Limitation

In this sub-section obstructing factors of highland and lowland linkages associated with resource and product inadequacy were presented.

7.2.1 Resource Limitation

One of the responsible factors that affected ecological linkage between the highlanders and lowlanders was identified to be resource limitation in both agro-ecological regions. In the survey it was found that, 46.5%, of the sampled respondents specified that resource inadequacy is

another factor that weakens highland-lowland linkages in Bale administrative zone (see Table 7.1). Ecological resources like grazing land, water wells/ponds and arable land, which had been playing a significant role in interlinking communities of the two agro-ecological regions, are currently found in the state of deterioration. Basically, these ecological resources degeneration stemmed from increasing pressure on their utilization (Yanda, 2003). Results of key informants interview and FGDs informed that the extensive grazing land of the lowlanders is diminishing due to mounting stocking and population pressures. The first responsible factor for this is, shift in the livelihood strategies of the lowlanders from whole livestock rearing to partial farming as adaptation strategies of food security. This in turn, leads to decline in the size of pasture land. Secondly, the highlanders also expand their farm plots towards the grazing lands of the lowlanders, as the productivity of their farm lands weakened due to fragmentation and over cultivation. Thirdly, the expansion of inedible weed varieties and encroachment of bushes in the grassland also contribute for the dwindling of grassland size. Finally, an extended drought and wildfire are also played their role in reducing the availability of pasture seasonally. Besides, the water wells/ponds of the lowlander, which were also favored by the highlanders (as source of *hora* and *haya*), have been also shrinking overtime due to different factors like decline in the level of ground water table resulted from deforestation and overgrazing in both agro-ecological regions, that increased surface runoff instead of percolation; poor water well management practice as well as climate change (Flintan et al., 2017).

Moreover, the size of arable land found in the highland agro-ecology is getting reduced because of different factors such as over division of the land to satisfy the ever increasing demand of farm land that arises from large family size in the highlands, increasing demand of the lowlanders to engage in farming practice in the adjoining highlands as a means of diversifying livelihoods and encroachment of large agricultural investment on land in the lowland agro-ecology. In this regard, it is worth noting to quote the works of Flintan et al. (2017) in Dello-Menna *woreda*.

> In *Berak* (RKA in Dello-Menna) today, community members say the continuing loss of their land to investors is the biggest problem that they face. The community is angry that their grazing land including their best grazing land is being given to investors by the government mainly by *woreda*

government agents with approval of zone/region administration authorities (Flintan et al., 2017: 84).

Hence, decline in the availability and accessibility of these ecological resources by both agro-ecological communities; in turn, reduces the frequency of visit they made to each other's agro-ecological region. Consequently, this weakens the interaction between them.

7.2.2 Product Limitation

The survey result showed that 44.2% of the sample respondents revealed that low agricultural production could be another factor that weakened highland-lowland linkage as a result of loose complementarity between the two (refer Table 7.1). Basically, low agricultural production is the cumulative result of deterioration in the ecological resources discussed above. To be specific lack of surplus product in the highlands of Bale is attributed to various factors like land degradation, land fragmentation, over cultivation, poor usage of agricultural inputs and climate variability (Bureau of Finance and Economic Development, 2014). As a result, crop production has dropped to a subsistence level, except few exceptional farmer households that produce surplus for market (refer Table 6.4 and 6.5). In this regard, key informant interview made in Rira RKA confirmed that most households in the *kebele* do not bring their barely product to market. They entirely utilize it for home consumption. However, this does not mean that subsistence level producers do not sell their product at all. Usually they tend to sell high value cereals and buy other necessities in exchange. A case in example is selling of pulses like peas and beans in exchange of *teff* in Mandera RKA.

On the other hand, the productivity of the lowlanders mainly depends on the availability of access to pasture and water wells. Thus, insufficiency in their livestock product is attributed to various factors such as depletion of water wells, degradation of pasture grounds and accessibility to animal health facilities.

7.3 Institutional Factors

Institutional factors that affect highland-lowland linkage include poor infrastructural development, administrative structure, lack of cooperation in utilization of communal resources and incompatible land tenure system between the highlanders and lowlanders. The structure of

government at national and regional level plays a role in promoting or discouraging interaction between communities of different agro-ecology. Presence or absence of good governance can influence the nature and magnitude of interactions. Obviously, non-existence of good governance can discourage interaction between different communities and even may result in negative reactions (Ives, 2001). On the other hand, good governance facilitates highland-lowland linkages and may result in positive reaction between them.

In this regard, discussants of the FGDs in the highland and lowland *woredas* have reported similar observations about the maladministration of government officials in igniting and exacerbating disputes between them. But the lowlanders feel that they were treated by the government unfairly. In this regard, one participant of FGD in Sawena *woreda* expressed his feeling as follows:

> I involved both in livestock rearing and crop cultivation. But I am not food self-sufficient yet. Had it not been for the safety nets program and support of some NGOs, I could not survive those bad days. This all happened to me due to faults of the government. I said because, the government knows that drought and disease affects our livestock annually, but the government had been not in a position to help us to overcome such incidences. For instance, I never could get access to agricultural inputs for my crop production since I started business. Treatments for my cattle reached me after I lost some of them. All such attentions are given for farmers in the highlands.

In this expression it should be clear that participants of the FGDs refer to administrative structure above the *woreda*, when they said government. Here, it looks that problem of farming inputs did not get attention it deserves, as the assumption of the government is households in the lowland dominantly engaged in livestock rearing. The assumption looks true as farming was introduced recently in such localities as a means of adaptation. However, from this expression, it is clear that the lowlanders sense that the government is biased to the highlanders.

Moreover, participants of the FGDs indicated that the existing ethnic based federal structure of the government does not consider benefits gained from agro-ecological integration. As a result, highland and lowland *woredas* act independently as there is no administrative structure that

interlinks them. This in turn makes attention given for infrastructures and services development to be less. A typical example raised by the discussants is the nonexistence of any formal road that connects the neighboring *woredas* of Sawena and Gololcha. Fortunately Goba and Dello-Menna *woredas* are connected through the all-weather gravel road that runs from Goba to Negelle Borena.

Furthermore, some participants of the FGD complained that the current structure of the government resulted in hostile relationship, particularly between *woredas* that have populations of different ethnic backgrounds. A case in example mentioned here is, the relationships between Somalis of Sawena *woreda* and Oromos of Gololcha *woreda*. Field observations of the researcher has also verifies this fact as the incidence of conflict between Oromo and Somali was reached climax during the data collection period in the year 2017. Although the cause of such incidence was complex, the devastating outcome was an indicator of unfriendly relationship between them, which likely hampered interactions between the two communities. Likewise, a key informant (adult) in Gololcha *woreda* Buria RKA expressed his feeling as follows.

> Occasionally, we get into conflict with Somalis of Sawena *woreda*. But conflict of this year (2017) is more serious than ever seen in my life. It reached peak due to unresponsiveness of the government. Personally, I do not have positive attitudes for the Somali as I experienced deliberate damages on my crops with their camels. I do not dare to speak to them as they keep their camels with gun.

From the above discussions, it is clear that complains against the administration originated from two perspectives. The first is increase in the frequency of the incident; the second is its reluctance to intervene the problems. And this directs to malfunctioning and maladministration of the government structure. Thus the current governance puts an adverse effect on the existing highland-lowland linkages in the zone.

Moreover, in the survey, it was found that 47.1% of the respondents indicated lack of cooperation on the use of communal resources weakened the interaction between them (refer Table 7.1). Nevertheless, pastoral way of life did not get attention it deserves for the last decades, though currently some policy measures were started to be effective. For instance, inception of pastoral institutions like Pastoral Affairs Standing Committee in the Parliament, a national

Pastoral Community Development Program (PCDP) and Pastoral Area Development Department (PADD), and Inter-ministerial board under the Federal Affairs Minister (Workneh, 2011) are some indicators of the initiative to sustain their livelihoods. Some of these institutions, particularly the PCDP was established in the study lowland *woredas* of Sawena and Dello-Menna. According to the development agents, these institutions are successful in range resource management efforts made in selected RKAs. However, other strategies aimed at integrating benefits of pastoralist and cultivators were not yet implemented.

Besides, lack of joint principles on how to manage communal resources had led to deterioration of ecological resources found in both agro-ecological regions. Particularly, pasture grounds in the lowlands are utilized on communal basis and governed by customary laws. Conversely, grazing and arable lands in the highlands are privately used and governed in statutory law. This discrepancy in land tenure and management system between the highlands and lowlands makes the resources of the lowlander were more easily accessible by other groups as compared to the highlanders. This in turn discomforts and makes them feel that their grazing land is taken by anyone due to tenure insecurity and strategy of the government. In this regard, Flintan et al. (2017) articulated the feeling of these communities in Dello-Menna *woreda* as follows.

> Communal lands, including the remaining grazing areas that many livestock keepers depend upon, remained unregistered and uncertified. Additionally, because livestock are moved to different areas for wet and dry season grazing the land from which they have come is left 'vacant' for part of the year. Local government argues that this land could be put to 'better' productive use, and with no certified owner the government can easily allocate that land to other users such as investors or to landless youth.

From this expression it can be inferred that variation in the tenure system of the highlanders and lowlanders also had led to unfriendly relationship between communities of the two agro-ecological regions and other groups. This in turn obstructed the positive interaction between them.

7.4 Socio-cultural Factors

Moreover, in the survey an attempt was made to identify socio-cultural factors that hinder highland-lowland linkages. However, the impacts of socio-cultural variables like absence of kinship ties (25.6%), language barrier (7.6%), cultural difference (6.4%) and ethnic animosity (16.3%) were found to be insignificant between the highlanders and lowlanders of Bale zone administration because the existing homogeneity in terms of ethnicity, language and religion. It was reported earlier that the dominantly spoken language by the communities of the two agro-ecological regions is *Afan Oromo*. Even though there are few households that speak Somali language in Sawena *woreda*, though this seem, it could not act as barrier due to the fact that both communities (the Oromos and Somalis) speak both languages. Thus, language may not act as a barrier toward the link between the highland and lowland. Likewise, the role of culture as impediment of highland-lowland linkage is trivial as both communities share common traditions manifested in practicing same religion in the study area.

Moreover, the binary logistic regression model was fitted to examining determinant factors of linkage strength. The dichotomous dependent variable, linkage status, either weak or strong, have been explained by explanatory variables like socio-cultural factors (existence of relatives or friends, participation in social affairs, looking educational and health services), economic factors (exchange of farm products, livestock, fire woods or charcoal, honey or coffee and labor) and ecological factors (availability of pasture, water, arable land and forest). Therefore, the role of kinship ties, social service, market, labor and natural resources in the study area have been examined.

Thus, the binary logistic regression model was used to identify determinants of linkage status among the above predictor variables. The model was selected as it is used to predict the presence or absence of strong linkage between communities in the highland and lowland. Stepwise (forward LR) method was employed as it is more appropriate for study that have no previous research to indicate which variables to expect to be more reliable predictors (Field, 2009). Hence, thirteen predictor variables were selected to explain the dependent variable (linkage status). However, in the stepwise regression method five of them fit the model and used for further analysis. The omnibus test of model coefficients has a Chi-square value of 152.8 on

1degrees of freedom, which is strongly significant at $p < 0.05$ indicating that the predictor variables selected have high joint effect in predicting the status of linkage. Usually R square has a value between 0 and 1. A value of R square near to 1 indicates that most of the variation of the response data is explained by different input values; whereas value of R Square near to 0 indicates that little of the variation is explained by the different input values (Field, 2009). Thus, as can be seen from Appendix V, R square for the model ranges from 0.44 to 0.59. This shows that 59.3% of the variation in the linkage status of the households is explained by variables entered to the model. Moreover, the predictive efficiency of the model showed that out of the 324 sample households included in the model, 278 (85.8%) were correctly predicted (refer Appendix VI).

Moreover, the regression coefficients are referred to estimate odds ratios for each of the independent variables in the model. The variables in equation results showed that exchange of agricultural products like cereals, participation in social affairs, health services, and exchange of ecological resources like fire wood honey were important determinants of linkage status in the zone. Participation in socio-cultural affairs came to be important determinant of linkage status in that, the higher the socio-cultural ties of the households, the stronger the likelihood of interaction between households in the highland and lowland agro-ecology. This implies that the odds of household who have kin-ship ties are 5.74 times more likely higher than household who have no such socio-cultural ties. The other important determinant of linkage status between the highlanders and lowlanders was found to be exchange of cereal products in the market. The exchange of cereal products in the market has significantly influenced the linkage status between the highlanders and lowlanders. Its P-value as shown, 0.00 is (much) less than .05 level of significance. Thus, the exchange of cereal products in the market has additional predictive power in the presence of the other twelve explanatory variables. For a unit increase in exchange of cereal products in the market, the amount of the linkage status between the highlanders and lowlanders gets stronger by 3.25 units when the rest variables are kept constant. Likewise, the exchange of fire-woods in the market significantly influenced the linkage status between the highlanders and lowlanders. Its P-value (0.048) is found to be less than .05 levels of significances. Hence, exchange of firewood products in the market has further predictive power in the presence of the other explanatory variables. This implied that linkage status of household which involved in the sale of firewood is 0.314 times more likely higher than a household that

did not participate in such market exchange. Similarly, linkage status of household, which involved in the exchange of honey, is 2.14 times more likely higher than a household that did not involve in market exchange. Moreover, households which visited health centers have linkage more likely than those who did not visit (refer Table 7. 6).

Table 7.6: Binary Logistic Regression Result

Variables in the Equation								
	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Exchange of Cereals (1)	3.251	.312	108.946	1	.000	25.829	14.026	47.563
Participation in Social Affairs (1)	1.749	.432	16.384	1	.000	5.748	2.464	13.404
Health Service Use (1)	1.063	.360	8.720	1	.003	2.894	1.430	5.860
Exchange of Honey (1)	.761	.383	3.950	1	.047	2.140	1.011	4.532
Sale of Firewood (1)	-1.158	.586	3.911	1	.048	.314	.100	.990
Constant	-.677	.555	1.488	1	.223	.508		

a. Variable(s) entered on step 1: Exchange of Cereals
b. Variable(s) entered on step 2: Participation in social Affairs
c. Variable(s) entered on step 3: Health Service Use
d. Variable(s) entered on step 4: Exchange of Honey
e. Variable(s) entered on step 5: Sale of Firewood

Source: Field Survey, 2017

7.5 Conclusion

The magnitude of linkage between the highlands and lowlands was not to the level expected due to the impact of some obstructing factors. These factors include inadequacy of infrastructure and market, resource and product insufficiency as well as institutional and socio-cultural and factors.

The poor state of motorable road that supposed to connects the adjoining highland and lowland communities and lack of surplus product weaken the magnitude of interaction between the two in sharing ecological resources and exchanging their products. However, it does not entirely break

their interaction, as they endure to interact through traditional means of transportation like pack animals and on foot journey.

On the other hand, resource insufficiency that resulted from decline of pasture land and arable land due to increasing pressure of human and livestock population the frequency of visit made between highlanders and lowlanders were reduced. Besides, product inadequacy that resulted from land degradation, land fragmentation, over cultivation, poor usage of agricultural inputs and climate variability reduced level of productivity to subsistence. This in turn, weakens the interaction between the highlanders and lowlanders of the administrative zone. However, the role of socio-cultural factors in impeding the interaction was found to be insignificant in the zone. In general, this concluding remark is in agreement with the findings of Jodha (2002) that generalized as the extent and intensity of highland-lowland linkage have increased with the increased physical, administrative, and market integration.

Moreover, in the attempt made to examine the determinant factors of linkage status between the communities of the highlands and lowlands, the binary logistic regression result showed that the predictor variables have high joint effect in predicting the status of linkage at significance level of $p < 0.05$. Result of the variables in equation showed that participation in social affairs, exchange of farm products and sale of fire wood or charcoal were important determinants of linkage status in the administrative zone.

CHAPTER EIGHT

CONFLICT BETWEEN HIGHLANDERS AND LOWLANDERS

In the preceding chapter an attempt was made to examine the interaction and linkage between the highlanders and lowlanders of Bale administration zone so as to share ecological resources, to exchange their products, to attend various social and cultural affairs and get social services. However, these forms of interactions are not always peaceful. They occasionally lead to conflictual relations. Hence, in this chapter an attempt was made to assess nature, causes and impacts of the conflicts as well as approaches of conflict resolutions.

8.1 Incidence of Conflict

In the first instance, the sampled respondents were requested to indicate the presence of conflict between the highlanders and lowlanders. Accordingly, 55.1% of them witnessed the occurrence of conflict, while the remaining 44.9% of them indicated that they did not recognize the presence of conflict between them. The incidence of conflict between the highlanders and lowlanders of Bale administrative zone seems less frequent in comparison to its prevalence observed between the highlanders of Amhara and lowlanders of Afar (75% and 32.5%) as reported by Workneh (2011). This may be attributed to cultural and ethnic differences between the conflicting parties as compared to the relative socio-cultural homogeneity in Bale zone. Such variations usually shift the target of conflict from livelihood drives to revenge act. Besides, the current study attempted to assess the incidence of conflict between communities of the same administrative zone but different agro-ecological regions.

In the survey, further effort was made to assess which agro-ecological region's community well recognized the incidence of conflict. Accordingly, it was identified that out of 55.1% of the sampled respondents that encountered conflict, about 34% of them are the highlanders, while the remaining 21.1% of them were lowlanders. This may be attributed to the occurrence of intra-agro-ecological conflict between the highland communities. In this regard, conflict over farm boundary is a common phenomenon among the highlanders, while damage of crop by livestock was the main pretext for conflict among the lowlanders (Yanda, 2003).

Table 8.1: Prevalence of Conflict by Agro-ecological Regions

Response		Agro-ecological region					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Is there conflict between the highlanders and Lowlanders?	Yes	137	34.0	85	21.1	222	55.1
	No	65	16.1	116	28.8	181	44.9
	Total	202	50.1	201	49.9	403	100.0

Source: Field Survey, 2017.

Moreover, the sample respondents that witnessed incidence of conflict were requested to indicate the rate of occurrence. Accordingly, the majority of them (74.3%) indicated that conflict occurs seasonally. The remaining 18.9% and 6.8% of them indicated that it occurs once in a year and frequently, respectively. This coincides with the seasonal movements of the highlanders and lowlanders in search of pasture and water and thus it has an implication on the main driver of conflict i.e. natural resource use pattern.

Table 8.2: Incidence of Conflict by Agro-ecological Regions

How frequent Conflict occurs?	Agro-ecological Region					
	Highland		Lowland		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Frequently	7	5.1	8	9.4	15	6.8
Seasonally	98	71.5	67	78.8	165	74.3
Annually	32	23.4	10	11.8	42	18.9
Total	137	100	85	100	222	100.0

Source: Field Survey, 2017.

As can be seen from Table 8.2, out of 137 and 85 sampled household heads that encountered the incidence of conflict 71.5% and 78.8% of the highlanders and lowlanders, respectively, witnessed that the incidence of conflict is seasonal. The remaining 23.4% and 11.8% of the highlanders and lowlanders, respectively, indicated the conflict happened at least once in a year. This suggests that the lowlanders encountered conflicts more often than the highlanders. This

further implied that the lowlanders, frequently moved to the highland agro-ecological regions, which in turn resulted in conflictual relationship.

In this regard, key informant interview held in Rira RKA revealed that though both communities move to each other's agro-ecological regions periodically, the visit was found to be more frequent by the lowlanders. Besides, it was indicated that the lowlanders travelled longer distance to get access to some ecological resources. As a result, they were hosted by the lowlanders for a while. Conversely, the highlanders commuted shorter distance and habitually get back to home after grazing and watering (mineral water).

8.2 Causes of Conflicts between the Highlanders and Lowlanders

Since more than half of the sampled respondents witnessed the prevalence of conflict, it would be reasonable and wise to survey its causes. These causes of conflict identified by the sampled respondents were organized as natural resource factors, socio-economic factors and political factors.

Table 8.3: Causes of Conflict by Agro-ecological Regions

Causes of Conflict	Response	Agro-ecological region					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Competition for communal resource utilization	Yes	129	94.2	63	74.1	192	86.5
	No	8	5.8	22	25.9	30	13.5
	Total	137	100	85	100	222	100.0
Land boundaries	Yes	125	91.2	50	58.8	175	78.8
	No	12	8.8	35	41.2	47	21.2
	Total	137	100	85	100	222	100.0
Practice of transhumance	Yes	123	89.8	20	23.5	143	64.4
	No	14	10.2	65	76.5	79	35.6
	Total	137	100	85	100	222	100.0
Natural resource projects being captured by other groups	Yes	65	47.4	6	7.0	71	32.0
	No	72	52.6	79	93.0	151	68.0
	Total	137	100	85	100	222	100.0
Breaking of protection agreements	Yes	115	83.9	12	14.1	127	57.2
	No	22	16.1	73	85.9	95	42.8
	Total	137	100	85	100	222	100.0
Unfair distribution of work and profits by government	Yes	110	80.3	11	12.9	121	54.5
	No	27	19.7	74	87.1	101	45.5
	Total	137	100	85	100	222	100.0
Jealousy related to growing wealth disparities	Yes	108	78.8	3	3.5	111	50.0
	No	29	21.2	82	96.5	111	50.0
	Total	137	100	85	100	222	100.0
Cultural difference	Yes	43	31.4	1	1.2	44	19.8
	No	94	68.6	84	98.8	178	80.2
	Total	137	100	85	100	222	100.0
Latent family and relatives' revenge act	Yes	108	78.8	16	18.8	124	55.9
	No	29	21.2	69	81.2	98	44.1
	Total	137	100	85	100	222	100.0
Other	Yes	10	7.3	0	0.0	10	4.5
	No	127	92.7	85	100	212	95.5
	Total	137	100	85	100	222	100.0

Source: Field Survey, 2017.

8.2.1 Natural Resource Factors

In this discussion, utilization of communal resources, land boundary issues and practice of transhumance are considered as natural resource factors of highlanders-lowlanders conflict.

As can be shown in the above Table 8.3, 86.5% of the sampled household heads identified competition for communal resource use as major cause of conflict. Out of these, 68.2% and 32.8% of them were the highlands and lowlands, respectively. As presented in the preceding chapter sections 6.1, the highlanders and lowlanders principally interact in utilizing the communal resources like pasture, water and forest. Although these ecological resources were communal in nature, their utilization can be limited to specified members of the defined territory only. As people out of the defined membership attempt to utilize them, disagreement may arise and hence they come to be sources of conflict. Furthermore, as indicated in Table 8.2, most of the conflicts that arise due to competition to use ecological resource were observed seasonally. This re-confirms that the highlanders move to the territories of the lowlanders during the wet season to look for pasture because lack of access to grazing pastures as their farm plots were covered by crops during this time. Conversely, the lowlanders travel to the boundaries of the adjacent highlands during the dry season to look for grazing and crop residues of the farm fields in the highlands. In most cases the two directional movements and interactions ended in peaceful manner. However, occasionally it resulted in conflicting situations. This is because the lowlanders thrives and survives with mobility. Inconsistent rainfall patterns, often randomly and sparsely distributed over large areas, make the ability to move herds over large distances indispensable (De Haan et al., 2014). However, the search for greener pastures by the lowlanders usually brings them in contact with the highlanders who are involved in crop production (Dimelu et al., 2017). In most cases, this contact results in an invasion of the farmland worked by the sedentary group, and the resulting conflicts are often violent and long lasting (Obioha, 2008; Yirbecho et al., 2004). Thus, hostility and conflicts arise mainly when the livestock are freely deployed without owner approval, supervision and destroy the crops and protected grasslands of the highlanders. As the key informants in Buria RKA explained, this happened when the lowlanders move and release their livestock earlier before the highlanders collect their crops. Besides, the key informants indicated that disagreement arise when livestock compacted the soils of their farm and damage the fences of their home through feasting and hooves. However, in most cases, movements of the highlanders to the territories of the lowlanders to look for pasture

and mineral water during and after the wet season do not lead to conflict. This may be attributed to the existence of extensive grasslands in the lowlands and insignificant impacts of the highlanders' livestock on the pasture ground as their herd size is small compared to the lowlanders. Moreover, observation of the researcher proved that the existence of customary tenure system among the lowlanders eased the access of such resources by the highlanders. This works true only to the limits of the carrying capacity of the communal lands. That seems why Hardin (1968: 1244) notified that "at a time the inherent logic of commons remorselessly generates tragedy". Similarly, Ibrahim (2015) revealed this issue in saying competition over access to and control over natural resources arising from its decrease in quality and quantity; population growth and weak political institutions are identified as major drivers of conflicts at global level. This implies that people who had been using the communal resource in peaceful manner for several year would get into conflict due to depletion of the resource. Conversely, entry to the privately owned grass lands and farm fields was found to be restricted in the highlands. However, the key informants also witnessed that exceptional conflicts occur due to looting of cattle by the lowlanders both intentionally and unintentionally done as cattle move being mixed with their cattle. Therefore, scarcity and mobility made conflicts inevitable between the sedentary peasants and mobile pastoralists (Markakis, 1994).

The other communal resource that drives the highlanders and lowlanders into hostility and conflict is water. Like the pasture resource, the highlanders and lowlanders move seasonally to each other's territory to share this resource. As most of the rivers and streams in the administrative zone originated from the highlands and drained to the lowlands, their availability gradually decreases and become scarcer in lowlands. As a result, the lowlanders are forced to excavate personal and communal water wells for later use during the dry season. These water wells of the lowlanders are also demanded by the highlanders for their livestock as they have salty content. As key informants in Buria and Mandera noted, conflict arises when the highlanders try to use water from the wells irresponsibly without the approval of the lowlanders who own the wells. This is mainly because digging out water from deep wells is very costly and can be easily damaged if not properly managed. In most of the cases, the lowlanders keep their water wells for later use in the dry season. Thus, in the wet season, they prefer to use the other sources of water like ponds, streams and rivers in their own agro-ecological region. Some households have private water wells and prohibit others not to use their wells. The lowlanders,

at time of extended drought season, are forced to move to the highland to get access to water for their cattle and other uses. This also could have leaded them into conflict occasionally.

The other important natural resource identified as source of hostility and conflict in the areas was forest resource. As forest resources are situated in the highlands of Bale administrative zone, the lowlanders move to this region at different periods of time in a year to get use of this resource. In the sample study *woredas*, it was identified that the lowlanders of Sawena community occasionally move to the highland forest regions of *Kubayou* in Gololcha *woreda*. Similarly, the lowlanders of Dello Menna *woreda* sporadically travel to the highland forest regions of Goba *woreda*. The lowlanders move to these forest regions of the highlanders to exploit forest based resources for various purposes like to get access to the forest grasses, to get access to shed for their cattle in the extended sunny seasons, to get access to trees to hung beehives, to get access to fire woods and charcoal as a source of fuel, income and construction materials as well as to get access to farm land particularly forest coffee. Like pasture and water resources, forest is also a communal resources by its nature, but its communal utilization is limited to the community in the predetermined territory. Hence, key informants in the Rira RKA revealed that conflict arises when other community members who are not legitimate to use this resource try to exploit it. For instance, conflict may arise when the lowlanders of Chirri RKA move their cattle to the adjacent forest regions of Rira to compete for the limited grasses in the forest. Besides, their cattle may destroy forest coffee and beehives hung-up on trees. Furthermore, habits of stealing other's beehives lead them into conflict with their neighboring highlanders. However, in a normal circumstance, the highlanders offer an opportunity to their neighboring lowlanders to engage in forest coffee cultivation and beekeeping.

In the survey, it was found that about 79% of the sampled respondents identified local land boundary as the main source of hostility and driver of conflict between the highlanders and lowlanders. Those who reported the same accounted to 91.2% and 58.8% and were among the highlanders and lowlanders, respectively. Such hostility mainly attributed to increasing demand for arable land following human population growth. Due to dense settlement and over cultivation in the highlands of Bale, the demand for farm land has been continuously increasing. In order to satisfy this ever increasing need for cultivable land, the highlanders expand their farm boundaries to the loose grazing boundaries of the lowlanders. This is in agreement with the finding of Yanda

(2003) that indicated about 76% of conflict between the sedentary farmers and mobile pastoralist in Tanzania was due to expansion of cultivation to the territories of traditional grazing area. On the other hand, the lowlanders, as a means of adaptation strategies, engaged in crop cultivation both in their own territory and in a relatively fertile adjacent highlander's territory. As a result the pastoralists started becoming agro-pastoralists. Hence, both parties involve in pushing one another's boundary. This in turn, reduces the size of their pasture ground and exposes their crops for damage by livestock and then drives them into conflict.

The other natural resource related factor of conflict is the practice of transhumance. In the survey, 64.4% of the sampled household heads witnessed that the vertical movement of the two seasonally with their livestock is key driver of conflict between the highlanders and lowlanders. Out of the respondents, about 90% and 23.5% of them were highlanders and lowlanders, respectively. This implies that, though the chief participants of the transhumance were the lowlanders, its impact was well recognized among the highlanders. Participants of key informant interview in Mander RKA (Sawena *woreda*) expressed their feeling regarding the practice of transhumance as follow:

> We had been engaged in the practice of *godantu*[12] since long years. We used to travel long distance as long as the territories of Fesesa (Gasera *woreda*) and Safoge (Gololcha *woreda*). We may stay for two to three months there. We returned back to our premises (lowlands) after the rain dropped and grasses grown. But these days we could not engage in such extended and long distance *godantu*, because of various reasons like depletion of the grazing lands, encroachment of the former routes by human settlement and crops. Hence, now we limited our *godantu* to the winter season, when farm fields left free of crops, to avert the risk of conflict with cultivators.

From this expression, it can be inferred that the lowlanders of Sawena *woreda* move up to 35km crossing *woreda* boundaries of Gololcha and Ginnir for the *godantu* system to look for pasture and water. The same idea was reflected by the key informants (elders) of Dello Menna *woreda* in that they had been involved in *godantu* system that extends between Chirri RKA to the peak of

[12] *Godantu* is an *afan oromo* term equivalent to transhumance in this context

Sannate plateau in Goba *woreda*. Besides, key informants in the highland *woredas* of Gololcha and Goba witnessed the practice of transhumance that was carried out by their adjacent lowlanders. On the other hand, they affirmed the practice of *godantuu*, where members of the lowland communities who have relatives and friends in the highland agro-ecology regularly move to them with their livestock during the extended dry seasons. Thus, conflict arises due to competitive use of grass lands and damage resulted from the movement of livestock. Therefore, it is plausible to conclude that, though transhumance had played role in driving the highlanders and lowlanders into conflicting situations, its prevalence now a days is very much reduced, and conflicts and hostilities that arise due to transhumance practice is becoming negligible.

8.2.2 Socio-economic Factors

In the survey, further attempt was made to assess the socio-economic factors that are responsible for the incidence of conflict between the highlanders and lowlanders of Bale administrative zone. Some of these factors include latent family and relatives' revenge act, resentment related to growing wealth disparities and cultural differences between communities of the two agro-ecological regions. As can be seen from Table 8.3, about 56% of the sampled household heads indicated that revenge act is social factor that ignited conflict. Resentment and disagreement created between individuals likely grow to community level hostility and conflict. One of its intensification is the act of revenge for damage inflicted on one of family members or relatives caused by earlier disputes. The other socio-economic factor identified by about 50% of the sampled respondents as factors of conflict is resentment or jealousy related to growing wealth disparities. This is attributed to the attitude of people not to be excelled by others. This individual level perception can be transferred to household and then extended to community level opinion. Thus, the highlanders and lowlander may reach at certain assumption regarding their wealth status. Instead of get determined to reach at equivalent status of wealth through hard working, people may opt to damage the wealth and resources of others. This in turn, can lead them into conflicting situation with any minor problem. This idea was fairly expressed by the key informants of Gololcha *woreda* Buria RKA as follows:

> Sometimes they (the lowlanders) damage our crops through their camels deliberately. They do not have any reason to do so, except feeling envy in our maize, coffee and Khat (*chat*).

Hence, it can be inferred that, once the feeling of jealousy developed in the minds of the community as a result of several pretexts like crop damage caused by livestock and grazing of livestock on others' farm field can be used as source of hostility and conflict. This can be further exacerbated through the act of revenge and reached the status of violent conflict between the highlanders and lowlanders.

The other socio-cultural factor identified by about 20% of the respondents was cultural difference between the highlanders and lowlanders. As discussed in the preceding chapter section 6.1.3, the socio-cultural linkage between communities of the two agro-ecological regions was found to be strong, for they are relatively homogeneous in terms of ethnicity, language and religious affiliations. Hence, the existence of cultural difference as a driving factor of conflict seems not foreseeable. However, the slight difference in ethnic background of Sawena and Gololcha *woreda* community, among ethnic Somalis and Oromos, manifested as cultural difference, which played role in the incidence of conflict between them. That is why the highlanders of Buria RKA of Gololcha *woreda* repeatedly complained on the damage caused by the camels of Mandera RKA of Sawena *woreda* on their crops when the writer was undertaking the survey. Similarly, other key informant in Buria RKA said "we do not have boundary for Oromos of Sawena". This implies that, the existing slight socio-cultural difference act as factor of conflict aggravation. This is in agreement with the findings of Blench (2010) that identified movement of pastoralists into new terrain, where language, religion, culture and landholding patterns are unfamiliar intensified conflict.

8.2.3 Political Factors

The other cause of conflict identified in the survey was political factor. This include unwise management of natural resource based development projects, which results from denying equal opportunities such as unfair distribution of employment and participation between local communities of different cultural background or individual basis, breaking of agreements to protect the resources and unfair distribution of work and profits by government between the two agro-ecological regions.

As can be seen in Table 8.3, about 32% of the sampled respondents indicated that, natural resource based development projects established for collective utilization but exclusively used by other group, is one of the political factors of conflict in the study area. A case recorded by one of

the key informants in Rira RKA is, an irrigation scheme of *Yadot* River was initially developed for the mutual benefit of Chirri and Rira RKA communities was entirely controlled by residents of Dello-Menna *woreda* including Chirri RKA. This has resulted in long lasting hostility between the two communities. Likewise, degraded pastureland rehabilitation project, which was launched in Dello-Menna *woreda,* was entirely seized by them. Although no conflict arose due to this project yet, it was found to be potential conflict area as others are excluded from the benefit.

Moreover, 57.2% of the sampled respondents indicated that lack of observing agreements to protect resources was found to be source of conflict between the highlanders and lowlanders. This can be attributed to different reasons like increasing competition for scarce resources, differences in resource use norms and traditions governing the highlanders and lowlanders and lack of integrated control mechanisms. As reported by participants of the FGD in Rira RKA, though arrangements were made to use and protect the various resources at the initial stage, progressively it began to be eroded by some groups through exploiting the protected forest and grasslands. As one group began to use these resources irresponsibly, the others express their grievance in different ways including dispute. This further grows to conflict between parties that agreed to use the resources mutually. A case in example indicated by the same participants was that not to use forest for charcoal and informal tree cutting for timber, not to hung beehives on some other person's tree, not to use the beehives of other person (*gagura namaa ulachu*[13]), to protect the forest coffee and forest from damage of livestock. Similarly, participants of FGD in Mandera RKA stated some of the customary laws that govern them in utilizing their grazing lands. These include not fencing the communal grazing land for private purpose, to protect grass land from fire and not to damage water wells.

On the other hand, variation in the regulation and customary rules governing utilization of resources between the highlanders and lowlanders contributed to occurrence of conflict between the two communities. For instance, forest and water resources were communally owned both in the highlands and lowlands of Bale zone. However, grazing lands were privately owned in the highlands but communally owned in the lowlands. As the communally owned resources are easily accessed and less protected, they are vulnerable to depletion, which in turn leads to further break up of other agreements meant for protection of resources. Besides, absence of coordinated

[13] The act of using one's beehive

resource management schemes contributed to the occurrence of conflict between those who shared the resource.

Furthermore, 54.5% of the sampled household heads indicated that unfair distribution of work and profits by government are also sources of conflict. This is attributed to unfair distribution of development projects including infrastructure and services. In case of Bale, the highlanders are situated at the center, accessible, densely populated; while the lowlanders are peripheral, inaccessible and sparsely populated. This is attributed to unfair distribution of developmental projects, besides natural resource endowment differences. Hence, the highlanders are favored in various ways due to historical and natural reasons. Thus, efforts need to be made to keep equilibrium by avoiding bias. This is concurrent with the report of UN-IFTPA (2010) that reveals governance itself can also be a source of conflict, even when it is designed to reduce tension or improve livelihoods. Natural resource policies and interventions are often made without the active participation of affected communities or enough consultation of stakeholders.

8.3 Impacts of Conflict

Conflicts that arise due to different factors noted in the preceding sections have inevitably resulted in several undesirable impacts. In this sub section an attempt has been made to assess the impact of conflict. In the survey, sampled respondents that witnessed the prevalence of conflict between the highlanders and lowlanders were requested to indicate consequences of conflict. Accordingly, the respondents identified several impacts of conflict and they were organized as humanitarian, social, economic and environmental impacts for convince in this study.

8.3.1 Humanitarian Impact

The humanitarian impacts include loss of human live and restricted movements, displacement from property, tension and absentees from school (Gutema and Jema, 2014; Manu et al., 2014A). In the survey, it was found that about 20% of the respondents observed loss of human life and restricted movement. However, greater proportions (80.2%) of them did not notice such impacts of conflict (refer Table 8.4).

Table 8.4: Types of Impacts of Conflict by Agro-Ecological Regions

Impacts	Response	Agro-ecological region					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Loss of human life and restricted movements	Yes	33	24.1	11	12.9	44	19.8
	No	104	75.9	74	87.1	178	80.2
	Total	137	100	85	100	222	100.0
Livestock raiding and crop destruction	Yes	45	32.8	11	12.9	56	25.2
	No	92	67.2	74	87.1	166	74.8
	Total	137	100	85	100	222	100.0
Deprivation of valuable pasture and water wells	Yes	116	84.7	18	21.2	134	60.4
	No	21	15.3	67	78.8	88	39.6
	Total	137	100	85	100	222	100.0
Overgrazing and land degradation	Yes	118	86.1	16	18.8	134	60.4
	No	19	13.9	69	81.2	88	39.6
	Total	137	100	85	100	222	100.0
Spread of livestock diseases	Yes	20	14.6	13	15.3	33	14.9
	No	117	85.4	72	84.7	189	85.1
	Total	137	100	85	100	222	100.0
Collapse of market and isolation from trade opportunities	Yes	94	68.6	18	21.2	112	50.5
	No	43	31.4	67	78.8	110	49.5
	Total	137	100	85	100	222	100.0
Food insecurity and dependency on food aid	Yes	105	76.6	9	10.6	114	51.4
	No	32	23.4	76	89.4	108	48.6
	Total	137	100	85	100	222	100.0
Tension in school and absenteeism	Yes	27	19.7	13	15.3	40	18.0
	No	110	80.3	72	84.7	182	82.0
	Total	137	100	85	100	222	100.0
Bush encroachment	Yes	115	83.9	9	10.6	124	55.9
	No	22	16.1	76	89.4	98	44.1
	Total	137	100	85	100	222	100.0
Displacement from property	Yes	66	48.2	12	14.1	78	35.1
	No	71	51.8	73	85.9	144	64.9
	Total	137	100	85	100	222	100.0
Other	Yes	4	2.9	4	4.7	8	3.6
	No	133	97.1	81	95.3	214	96.4
	Total	137	100	85	100	222	100.0

Source: Field Survey, 2017.

Although loss of life due to highlanders-lowlanders conflict which occasionally happened, it created unnecessary tension between the communities of the two agro-ecologies, which in turn, resulted in reduction in the magnitude of interaction. In some occasions, it leads to controlling the movement of people and livestock for some time. This could have further incited conflict and promoted the cyclic conflict to continue.

The other humanitarian impact of conflict identified in the survey was displacement of people from their property. 35.1% of the sampled respondents witnessed this impact of conflict in their locality. It is apparent that, once conflict arose and loss of human life witnessed, other members of the group began to leave their place of origin to escape atrocities. Besides, people were obliged to leave their premises forcefully. This further leads to other humanitarian consequences like absenteeism and drop out from schools. In the survey, about 18% of the respondents indicated that due incidence of conflict students were forced to forfeit attending classes and finally drop out from schools. The non-attendance of school may last for months, while the drop out persists for a year. This absenteeism and drop out applies either for the whole school community or some part of the community where the incidence of conflict occurred.

8.3.2 Social Impact

The humanitarian impacts discussed above further leads to social consequences like break in the social cohesion, mistrust and suspicion between communities. Data obtained from key informant interview revealed that once such incidence of conflict took place between the highlanders and lowlanders, it resulted in weakening their relations as the feeling of mistrust developed between them. In this regard, one participant of key informant interview in Mandera RKA expressed his feeling as follows:

> Actually we do have good culture of conflict resolution. So far we managed conflicts of different magnitude starting from individual or household level to community level by employing different strategies like *guma*. The aim of *guma* here is to clean all hatred in the heart of the disputants. However, among few disputants some sort of mistrust and suspicion may remain in their hearts. As to me it is this remaining of mistrust that leads to decline in our social cohesions.

Conflictual situation breaks social cohesion which is manifested by mistrust and hostility between the two groups. It therefore, creates an atmosphere of mutual suspicion and tension which is a threat to peace, security and progress of any society (Manu et al., 2014; Abbass, 2012). Moreover, conflict affects education of children leading to obstacles in their development and mass displacement. Consequentially, this weakens the once mutually existing sedentary peasant and pastoralist relationships. This terrible situation becomes worst, especially when either the sedentary peasant or the pastoralist is categorized into a group relating to religion, tribe or region (Akujobi et al., 2016). This implies that, though different attempts were made to avoid such social ills created after an incidence of conflict, they still persist and impacted the linkage between the highlanders and lowlanders.

8.3.3 Economic Impact

In the survey, it was found that conflict between the highlanders and lowlanders resulted in numerous adverse economic impacts. These include collapse of market and isolation from trade opportunities, food insecurity and dependency on food aid, livestock raiding and destruction of crops as well as spread of livestock diseases.

As can be seen from Table 8.4, 50.5% of the respondents indicated that conflict resulted in collapse of market and isolation from trade partners. This is attributed to absence of both sellers and buyers from the market due to security issues and sometimes ban of transport routes by the disputants. When such circumstances persist for long, undoubtedly it leads to market failure. This further slows down exchange of goods and commodities between trade partners.

The other economic impact of conflict identified by 51.4% of the respondents was problem of food insecurity and reliance on food aid. As both the highland and lowland communities are not self-sufficient, they can satisfy their need through market mechanism. However, as markets were collapsed due to security concerns, parts of community in both agro-ecological regions were likely exposed to food insecurity problem. This further could have increased the number of people that were food aid dependent. Hence, conflict as one form of shocks, could have likely increased the vulnerability of both highland and lowland communities, in general, and the lowland communities in particular, to food insecurity.

Furthermore, livestock raiding and crop destructions were identified as both causes and consequences of conflict. In the previous discussion of section 8.1, livestock looting and crop damage and failure were recognized as initiators and intensifiers of conflict between the highlanders and lowlanders. Here again, 25.2% of the respondents identified them as consequences of conflict. The act of livestock raiding and crop damage might have generated either retaliation for the damage inflicted in the past or in search of necessities like income, food, grazing lands and water wells. This in turn, resulted in reduction of agricultural products (crop and livestock), that can lead to poverty in the long run. Resource based conflict usually deteriorate individual livelihoods and it affects development and provision of essential services in sedentary peasants and pastorals areas through disruption of the communities' livelihood systems by restricting access to natural resources (Gutema and Jema, 2014; Akujobi et al., 2016; Dary et al., 2017). This loss of properties in turn leads to food insecurity and liquefy people's livelihoods. So many scholars agree that, this situation further creates serious obstacle to local development, particularly agricultural activities (Moritz, 2010; Sekeris, 2010; Abdulai and Yakubu, 2014 and; Manu et al., 2014). This is mainly because, conflicts result in damages to irrigational facilities, destruction of reservoirs, burning of rangelands and farmlands.

The impact of conflict is not limited only to agricultural products, but also extends to social services like animal health clinics. About 15% of the respondents reported that once the livestock health keeping service was disrupted due to conflicting situations between the two parties, which then paved ways to the outbreak of animal diseases. Livestock diseases could have easily spread due to the incidence of conflict. Such spread of animal diseases in turn resulted in loss of livestock life (see Table 8.4).

8.2.4 Environmental Impact

Conflict can also impact the natural environment in various ways such as deprivation of access to pasture and water wells, overgrazing and land degradation as well as bush encroachment. In the survey, it was found that 60.4% of the respondents pointed out that conflict between the highlanders and lowlanders resulted in deprivation of access to valuable grassland and water wells. This happened because the formerly protected grasslands and water wells can easily exposed to massive number of livestock herds. Thus, the pasture grounds can definitely

exhausted as there is no proper management of crowds and grasslands. Similarly, the water wells can be dwindled due to excessive and misuse of the water resource. Then the wells can easily dumped with soils and unable to store water for later use. Most of the time, this type of damage was generated by the groups who were not the formal owners of the water wells and pastures. The impact of the damage may persists until rainy seasons come, so that, grasses grow and well rehabilitated. Renewal of the wells can also costs human labor, which in return could have caused reduction in livestock productivity.

Moreover, as conflict restricts spatial movement of people and livestock, both the highlanders and lowlanders are forced to graze over specified territory. This in turn, leads to overgrazing and land degradation (see Table 8.4). It is clear that as massive herds stayed over restricted area created overgrazing, it exposed the topsoil for wind and water erosion. This in turn, declines the rate at which grasses regenerated. Furthermore, it challenged the perception of the lowlanders that stated as "*lon kotte dheeddi*" in *Afan Oromo*, which means the movement is mandatory in the traditional practice of livestock rearing. From this famous quote of the lowlanders, it can be inferred that the productivity of livestock increases, as they feasted a varieties of feeds from the different agro-ecological regions. Hence, restriction of browsing at a given locality thought to reduce the efficiency of livestock besides damaging the natural environment.

On the other hand, as conflict forced people to leave their place of origin, it resulted in bush encroachment of landholdings of the migrants. In the survey, about 56% of the respondents witnessed the same fact. Intrusion into the previously protected bush lands furthered damage the natural environment through human settlement, deforestation of land for crop cultivation and overgrazing.

In general, this finding is in line with findings of several scholars who made investigation in the field. The environmental impacts of conflict identified by researchers include bush burning, soil erosion, compacting of soil, loss of soil fertility and biodiversity (Adelakun, Adurogbangba and Akinbile, 2015; Ofuoku and Isife, 2009; Boateng, 2015). These situations in turn, produced unsuccessful outcomes which do not promise well for socio-economic sustainability and livelihood wellbeing of the community in the two ecological regions (Nchi, 2013; Akujobi et al., 2016).

8.4 Conflict Resolving Strategies

The conflicts instigated by various factors resulted in consequences of problems of different magnitudes. However, in all periods of conflict, both the highland and lowland communities employed different strategies to control the problems before they reached to violence.

Regarding conflict resolution strategies, data were collected in focus group discussions (FGDs) and key informants interview. Accordingly, the qualitative data gathered showed that the highland and lowland communities utilized both formal and informal institutions to resolve conflicting situations.

8.4.1 The Customary Law

In the study area, both the highlanders and lowlanders were governed by the rules of statutory institutions. However, the lowlanders are administered more by the rules of traditional institutions. Elders are key role players in this regard. Based on the nature and magnitude of the conflict, elders take part in handling the issue. The famous conflict resolution approach of the customary law in the locality is "*jarsumma*" in *Afan Oromo*, which is equivalent to 'councils of elders' in English. One participant of key informant interview (elder) in Sawena *woreda* (Mandera RKA) expressed his idea, when asked about the types of conflict they handled, strategies employed and processes followed during conflict resolution, as below:

> We used to handle conflicts that arise from, use of natural resources and agricultural products, as well as social relationships. If the conflict involves communities of different RKA, we nominate equal number of well-known elders from the two RKAs. Then we make an appointment in a specific place (usually under *oda* tree) to deal with the problem. In the day we prearranged, we begin to critically examine the issue and identify the problem creator. Once we did this, we may decide *guma* (*afan Oromo* term to mean compensation) for the mistreated group to be paid in kind.

From the above expression, it is likely to infer that through the approach of "*jarsumma*" it is possible to arbitrate varieties of issues of conflict such as conflict over pasture, water wells, damage of crops, looting of livestock, and other social disputes that arise from rape and abduction. Nevertheless issues of rape and abduction are decided to be overseen by the statutory

laws of Ethiopia; they are still managed by elders of the lowlands in disguise. This implies that the customary institutions are influential in handling big social troubles till now.

Moreover, it can be inferred that one of the strategies employed in *jarsumma* approach is *guma*. *Guma* is given for the harmed group or individual as compensation for the lost life and other forms of body and or social damages as they adhere to the traditional belief that "blood dries up with blood" to mean that excuse from the bottom of heart can be guaranteed through slaughtering of cattle. The number of cattle to be sloughed is determined by the magnitude of damage. However, there are times when all the meat of the sloughed cattle would be eaten up in the final date of negotiation rituals.

Further probing was presented for the participants of key informant interview about the success rate of *jarsumma*. Accordingly, almost all the participants agreed that it was a successful approach of conflict resolution favored by reasonable proportion of the highland and lowland communities. This is concurrent with the findings of other scholars like Abate (2011) who claimed that traditional mechanisms are the most appropriate in dealing with the root causes of conflict and establishing sustainable peace. Moreover, experience has shown that peace agreements founded on traditional systems and mediated by traditional institutions are the ones that have the most legitimacy and the highest chances of success. Thus, traditional leadership through customary institutions is dominating in the most remote and marginalized pastoralist and sedentary farming communities (Bamlaku et al., 2015; Ibrahim, 2015).

8.4.2 The Statutory Law

Based on the nature of conflict, the statutory law is also utilized by both the highland and lowland communities. In this regard, the first question posed on to the participants of FGD and key informant interview was to indicate their preference of handling conflicting issues between them. In their response, they underlined that what matters in the preference of conflict resolving institutions depend on the nature of the conflict. Hence, they agreed that for conflicts that involve the entire or part of RKA's community, the customary institutions are preferable as it is very difficult to bring the case to court. For conflicts that involve few participants of the community, both the formal and informal institutions are appropriate and the decision to be judged by which institutions is left for the disputants. In spite of this fact, there is disparity in the preference of the two conflict resolving institutions between the highlanders and lowlanders. Mostly, the

highlanders tend to be governed by the statutory laws as these institutions are relatively well developed and perceived as modern settings. On the other hand, most of the lowlanders inclined to be governed by the customary laws as these institutions are relatively more preserved and valued there. Besides, the communal tenure of the ecological resources can be well managed by the indigenous institutions than the modern institutions.

8.5 Conclusion

Incidence of conflict between the highlanders and lowlanders of Bale zone was found to be seasonal. Although it was driven by factors of natural resources, socio-economic and political elements, conflicts that are related to the use of grazing space and water are more prevalent than, those which are purely ethnic in nature. However, its impact in weakening the ecological, economic and socio-cultural linkage of the once mutually existing highland and lowland communities was found to be significant. Moreover, such conflict resulted in humanitarian, social, economic and environmental consequences. Nevertheless its devastating impacts, both the highland and lowland communities employed the legal and indigenous conflict resolution strategies to curb the problem. In general, previously noticed conflicts were merely due to overlap of livelihood strategies between communities of different agro-ecologies but recently, this conflict has escalated, taking another dimension of ethnic and religious differences with little effort from government or community leaders to address the problem in East Africa (Ibrahim, et al., 2015). Thus, it deserves the need for attention by all stakeholders.

CHAPTER NINE

IMPLICATION OF HIGHLAND-LOWLAND LINKAGE ON RURAL LIVELIHOODS

In this chapter discussion was made on the livelihoods of the highlanders and lowlanders, their vulnerabilities and coping strategies as well as role played by highland-lowland linkage in improving the livelihoods of highland and lowland communities. To this effect, the analytical construct of livelihoods, primarily devised by Robert Chamber and Gordon Conway (1991), and then developed by other scholars was employed in combination with the extended Human Environment System (HES) model established by Huber et.al (2015).

9.1 Livelihoods of the Highlanders and Lowlanders

Traditionally, it was believed that rural communities are homogeneous. It is to mean that rural communities relied on a single way of making living, which is agriculture. However, in this discussion an attempt was made to examine the means by which the highlanders and lowlanders make their living. As to where to start the discussion, scholars follow different methods of employing the sustainable livelihood framework. Some favor to start from the vulnerability context, as they believe that it is the incidence of stress, shock and seasonality that enforce households to make asset. Others prefer to begin the discussion with household asset as they believe that asset can be affected by vulnerability context. Although both styles look factual, in this discussion, the second approach was employed as studying the asset types and status first gives an ideal insight concerning which agro-ecological communities were more vulnerable for such stresses, shocks and seasonality.

Thus, in this discussion, first attempt was made to identify the types and magnitudes of assets of the highlanders and lowlanders of Bale administrative zone. Accordingly, the five categories of asset/capital that include human capital, natural capital, physical capital, social capital and financial capital were discussed.

1. Human Capital

This type of capital forms the basis for the productivity of the highland and lowland communities. It can be expressed in terms of gender and occupational status of the household

head, household size and age of the household head as well as educational status of the household head.

Table 9.1: Sampled Respondents by Gender and Occupation across Agro- ecological Regions

Occupation of the HH Head	Gender of the HH Head	Agro-ecological Regions					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Agriculture	Male	164	40.7	150	37.2	315	78.2
	Female	6	1.5	18	4.5	24	6.0
	Total	170	42.2	168	41.7	339	84.1
Merchant	Male	6	1.5	6	1.5	12	3.0
	Female	8	2.0	3	0.7	11	2.7
	Total	14	3.5	9	2.2	23	5.7
Housemaid	Male	0	0.0	0	0.0	0	0.0
	Female	3	0.7	9	2.2	12	3.0
	Total	3	0.7	9	2.2	12	3.0
Government Employee	Male	1	0.2	5	1.2	6	1.5
	Female	0	0.0	1	0.2	1	0.2
	Total	1	0.2	6	1.5	7	1.7
Labor Work	Male	8	2.0	7	1.7	15	3.7
	Female	5	1.2	2	0.5	7	1.7
	Total	13	3.2	9	2.2	22	5.5
Total	Male	179	44.4	168	41.7	348	86.4
	Female	22	5.5	33	8.2	55	13.6
	Total	202	50.1	201	49.9	403	100.0

Source: Field Survey, 2017.

a. Gender and Occupation of the Household Heads

In the survey, out of the total surveyed sampled respondents, 339 (84.1%) of the household heads' occupation was identified as agriculture. Out of these household heads engaged in agricultural sector, the overwhelming majority (78.2%) of them were male headed households. The remaining 6% of them were female headed households (see Table 9.1). This implied that agricultural activities are most favored by male headed households in comparison to female headed households in the administrative zone. This may be attributed to the gender selective nature of the sector as agriculture is practiced traditionally through investing large labor and

human energy in Ethiopia in general, and Bale zone in particular. Thus, male household heads and male family members are important sources of human capital for the agriculture sector. However, this does not mean that female headed households and female members of the family do not engage in the sector, instead the sector is less favored by them due to the reason mentioned above. Likewise, Sultana and Liu (2017) indicated that gender had negative and significant impact on livelihood diversification options of households. This implies that female headed households do not tend to participate and diversify non/off farm livelihoods as compared to their male headed counterparts. However, study of Doyo (2017) come up with controversial findings which state that female headed households positively influenced the decision to diversify livelihood activities as compared to male head households. Such discrepancies might arise due difference in setting of the study area which mainly influence the livelihoods of households.

Regarding the distribution of sampled respondents in terms of household heads' gender in the two agro-ecological regions, more male headed households that accounted for 40.7% engaged in agricultural activities in the highlands of the zone in comparison to male headed households in the lowlands (37.2%). Conversely, female headed households of the lowlands that engaged in the sector accounted for 4.5%, while the highland counterparts of female respondents accounted for 1.5%. This can be attributed to the nature of the agricultural activities, custom of the community and availability of options to engage in other means of livelihoods. In terms of the nature of the agricultural activity, plowing of land that is dominantly practiced by the highlanders often done by males and male headed households due to the custom of the community and the muscular strength the work demands. On the other hand, the lowlanders dominantly engaged in livestock rearing that can be normally performed by both gender categories, except for the extended practice of transhumance. And that looks why slightly higher proportion of female headed households in the lowlands engaged in agricultural activities. Besides, female headed households in the highlands of the zone have alternative options to engage in secondary sectors of the economy like trade (2%), as the highlands better offer an opportunity for such economic activities.

Therefore, as agriculture appears gender selective livelihood option, male headed households and male dominated family members appears an important source of human capital in the zone.

b. Household size and age of the household heads

In both the highland and lowland agro-ecological regions, household size can be considered as an important human capital as it plays role in creating various means of making live. This is attributed to the labor intensive nature of agricultural activities both in the highlands and lowlands. The findings of Desalegn and Markos (2016) revealed that household size has positive association with livelihood diversification. This is attributed to possibility to engage in extra works that generate income for the households. Likewise Doyo (2017) indicated that household size has profound impact on the livelihood outcome of households.

However, this can be realized, when all the household members are in the productive age categories. Otherwise, the reverse may holds true in the lower and upper age categories, as large dependent household members create more burden on the existing means of living. But it has to be noted that rural children begin to engage in agricultural activities in their early ages starting from low energy demanding tasks such as looking after small number of cattle, shoats and calves. Others can also contribute in serving the family members that are engaged in the main productive activities through collecting water from different sources, shopping, cooking and etc. Thus, the contributions of large household size overweight its shortcomings, even at lower ages, as they are considered as potential human capitals. The distribution of these indicators of human capital across the two agro-ecological regions is presented in Table 9.2 below.

Table 9.2: Age and Household Size of Sampled Respondents by Agro-ecological Regions

Indicators of Human Capital	Agro-ecological Regions							
	Highland				Lowland			
	Mean	Max.	Min.	Range	Mean	Max.	Min.	Range
Age	38.29	89.00	19.00	70.00	36.87	70.00	18.00	52.00
Total Household Size	6	19	1	18	8	20	1	19
Number of working family members	3	11	1	10	4	13	1	12

Source: Field Survey, 2017.

In the survey, it was found that there is slight difference in the mean age of household heads in the highlands (38.3) and lowlands (36.9). Although it is difficult to justify the reason for such variation, it is plausible to associate it with the vulnerability of households to environment

related diseases and the availability and accessibility of health services. Hence, it is possible to generalize that household heads' age, which is important indicator of human capital among rural communities, is found in the productive age category in both agro-ecological regions. However, as age of household head alone could not give full picture of productivity of age, it would be worth-noting to deal with total household size and number of working family members. Accordingly, the average household size for the highlanders and lowlanders was found to be 6 and 8, respectively. The average household size of the lowlanders is comparable with the findings of Workneh (2011) that was found to be 8.13. These figures indicate that the lowlanders have relatively larger household size than the highlanders. This can be attributed to different socio-cultural and economic factors. In this regard, key informants in Sewena and Dello-Menna *woredas* highlighted the custom of polygamy and lack of access to birth control services as the overriding factors. This is in line with the findings of Flintan et al. (2017), which indicated that the practice of polygamy is higher in the lowland *woredas* of the zone, particularly in Dello-Menna *woreda*. Relatively, as the highlanders have better access to family planning education and services they have limited their family size. Similarly, the average number of working family members accounted for 3 and 4 for the highlanders and lowlanders, respectively. Therefore, in terms of the productive age group family size, lowlanders appear have better human capital than the highlanders assuming other factors constant.

c. Educational status

Education is also an important indicator of human capital in rural communities. The general assumption is that an educated household head is more productive than the uneducated household head. The rationale is that an educated household head can innovate or adopt new technologies that could increase his agricultural production faster than the uneducated. Besides, such household head can engage in other income generating works in off-farm activities. Furthermore, an educated household head gives value for education and thus makes his family members to attend education. This in turn can diversify their source of income. The findings of Doyo (2017) witnessed that literate pastoralist diversify their livelihoods to other forms of agriculture as compared to illiterate pastoral households. This is attributed to skill, experience and knowledge they gained through education (Doyo, 2017). In this regard the survey result revealed that, 33.5% of the sampled respondents were illiterate and 35.7% of them were able to

read and write. The remaining 30.7% of them attended formal education from elementary to higher education levels (see Figure 5.3). This implies that the proportions of literate household heads were higher than the proportion of illiterate household heads. In terms of their agro-ecological region illiterates accounted for 14.9% and 18.6% respectively, for the highlanders and lowlanders, implying that the highlanders were more literate than the lowlanders.

Thus, education as an indicator of human capital was found in good status in the study area. However, from the point of view of the role education played in creating new ways of production and adopting new technologies created by others, it is hardly possible to conclude that education served as an important human capital, as the proportion of household heads that attend higher education was found to be very few.

In general, in terms of human capital that can be viewed from the point of view of age, occupational status, household size and educational status of the household head, the highlanders were better of except for the size of working family members, in which the lowlanders appeared excelled that of the highlanders.

2. Natural Capital

Although natural capital includes various nature gifted resources, in the survey emphasis was given for the essential natural capitals upon which rural livelihoods depends. Thus land, forest and water resources were discussed.

a. Land

As the overwhelming majority of rural households are engaged in agriculture, land particularly plot size can be considered as an important natural capital. Although the livelihoods of the highlanders and lowlanders differ, both demanded land to pursue their livelihoods. The highlanders need land for ploughing and then cultivating varieties of crops, vegetables and fruits. Besides, they need land for pasture purpose. Similarly, the lowlanders demanded land for grazing and cultivation. As the majority of the surveyed household heads were indigenous to the locality, all of them have land plots to use. So, in this case what matter is the size of the plots.

Table 9.3: Plot Size of Respondents by Agro-ecological Region

	Agro-ecological Regions							
	Highland				Lowland			
	Mean	Max.	Min.	Missing	Mean	Max.	Min.	Missing
Plot Size (ha)	2.28	6.0	1.0	41	2.0	7.0	1.0	29

Source: Field Survey, 2017.

In the survey, it was found that on average households in the highland have 2.28 ha of landholding. The maximum reached to about 6 ha while the minimum was about 1ha. On the other hand, households in the lowland had landholding of 2.00 ha on average. The maximum and minimum landholding sizes were 7.0 and 1.0 ha, respectively. Thus the average farm plot holding of the study area is about 2.14 ha. This implies that land holding size of the lowlanders was slightly greater than the highlanders. Basically making such comparison may not be reasonable as their livelihoods and farming system are different. For instance, in the highlands, farming and livestock rearing i.e. sedentary and mixed agriculture is dominant. They have privately owned small holdings upon which farming and grazing practiced. On the other hand, the lowlanders have both communal and private tenure arrangements that can be utilized for livestock rearing and crop cultivation. Thus, difference in plot size between communities of the two agro-ecological regions may arise from such variations in land tenure structure and livelihoods. In addition, in the survey, it was found that some respondents did not want to tell their plot size for different reasons. As indicated in Table 9.3, about 70 households did not respond to this question. Out of these 41 were highlanders and the remaining 29 were lowlanders. This implies that landholding is a sensitive issue in the highlands than in the lowlands. In order to overcome such trouble of getting misleading information on plot size, an attempt was made to cross-check with their production and income levels of the sampled households. The finding of this study is comparable with estimates of per capita land holdings by Desalegn (2009). According to regional estimates made by Desalegn, household heads of Arsi, Gojjam, North Wallo, parts of Tigrai and *Enset* zone possessed 2.5, 2.0, 1.25, 1.25 and 1ha, respectively. In general, the landholding of communities in the two agro-ecological regions is greater than the national average of 0.93ha per household (Demese, 2015) in 2011. This may be attributed to the fairly large range lands found in the area, particularly the lowlands.

b. Water resource

The other form of natural capital in the study sites is water resource. This resource can be utilized for irrigation agriculture and livestock consumption among the rural communities besides home consumption. Therefore, availability and access to rivers and springs are important indicators of natural capital both in the highland and lowland agro-ecologies of Bale zone. As these resources are communal in all parts of the study data was obtained at *woreda* level.

Table 9.4: Water Resource Availability by Agro-ecology

Sources of Water Resource	Agro-ecological regions	
	Highland	Lowland
	Number	Number
Rivers (perennials and Seasonal)	10	5
Springs	7	4

Source: Agriculture and Rural Development Office of the Respective *Woredas,* 2017.

As can be seen from Table 9.4, both the highlands and lowlands are well endowed with water resource. Rivers and springs originated from highlands and flow to the adjacent lowlands. As a result there is small variation in the number of rivers and springs in the two agro-ecologies. However, most of the rivers in the lowlands are seasonal in comparison to those in the highlands. This may be attributed differences in surface configuration (or relief situation) and climate, and variation in the number of tributaries that drain into main streams and the pool of these tributaries to form perennial rivers there. Regarding their utilization *Yadot* River in Dello-Menna *woreda* has been used to generate local hydro-electric power. All the remaining rivers were not utilized effectively both in the highlands and lowlands except small irrigation scheme developed locally by individual households. Hence, if properly used, this natural asset is vital in improving the livelihoods of households.

c. Forest resource

The other important source of natural capital is forest resource. This resource spatially covers both the highland and lowland agro-ecologies. However, its cover is relatively dense in the highland *woredas* of the study area. Particularly, in Rira RKA of Goba *woreda* and Buria RKA of Gololcha *woreda*, dense forest cover was observed. This implied that the highland agro-ecology is better endowed with forest resource in relative to the adjacent lowland regions.

Table 9.5: Forest Resource of Sampled *Woredas* by Agro-ecology

Forest in the *Woredas*	Agro-ecological Regions			
	Highland		Lowland	
	Coverage in ha	Percent	Coverage in ha	Percent
Sawena			52,697.86	
Dello-Menna			75,223.00	
Gololcha	178,000.00			
Goba	48,898.08			
	226898.08	63.9	127920.86	36.1

Source: Agriculture and Rural Development Office of the respective *woredas*, 2017

This forest resource can be utilized for various purposes like charcoal and firewood, incense and gum collection, beekeeping and grazing field (Morse et al., 2009). In the study an attempt was made to examine the utilization of forest resource by the local community. To this end an interview was made with key informants in all the four study sites. Accordingly, all the informants denied utilization of forest resource for charcoal (see Plate 9.1) and firewood (see Plate 9.2) purposes, except the dried up trees and its leaves. However, the actual observation in the field exposed the practice of deforestation was sever, particularly the in highland RKAs of Rira and Buria. Besides, charcoal was sold widely in the market and along road sides of Chirri and Mandera RKAs. Moreover, key informants in Sewena *woreda* (Mandera RKA) and Dello-Menna *woreda* (Chirri RKA) witnessed the utilization of forest non-timber production such as production of gum and incense. Likewise, informants in Goba *woreda* (Rira AKR) and Gololcha *woreda* (Buria RKA) revealed the use of forest for honey harvest by hanging up beehives. Hence, the highlands are gifted with forest resource as a natural capital and utilized for various purposes.

Plate 9.2: Charcoal on Sale in Sawena MARKET

Plate 9.1: Fire-Wood in Goba (Rira RKA)

Source: Own Observation

3. Physical Capital

This category of capital includes households' production resources, basic infrastructure and services as well as water wells and ponds. Analyzing the physical capital of households demanded listing of all fixed and durable assets of households in the highlands and lowlands (Morse et al., 2009). Thus, in this discussion included are those physical assets which have direct linkage with rural households' livelihoods were presented.

a. Households' production resource

The livelihood of rural households of both highland and lowland largely relied on agriculture. In pursuing their livelihoods the households utilized various production resources like agricultural equipment and livestock resources. In the survey an attempt was made to assess these production resources. Accordingly, only two household heads of the lowlands indicated that they have grain mills. None of the sampled household heads possessed machineries like combiner and tractor either for their own production or for renting purposes. The other traditional agricultural production tools are common for all households.

The most important production asset of households both in the highland and lowland regions of the study sites is livestock resource.

Table 9.6: Livestock Assets of Respondents by Agro-ecology

Categories of Livestock Assets	Agro-ecological Region		
	Highland	Lowland	Total
	Avg. No	Avg. No	Avg. No
Oxen	2.79	3.94	3.52
Cows	4.23	8.48	6.24
Goats	5.45	9.67	7.57
Sheep	15.93	6.00	12.72
Camels	.	8.62	8.62
Donkey	1.33	1.25	1.27
Horse/mule	1.46	2.00	1.47
Total TLU	824.52	1491.03	2315.55
Per-capita TLU	4.08	7.42	5.75

Source: Field Survey, 2017.

As can be seen from Table 9.6, both highland and lowland household's possessed varieties of livestock assets. When we see the distributions of these livestock across the agro-ecological regions of the study area, oxen, cows and goats have higher stocking density in the lowlands of the zone, though the population of sheep was dense enough in the highlands. Camels are entirely raised in the lowlands. The proportions of donkeys and hens were fairly distributed in both agro-ecologies. The average per capita TLU of the study area was found to be 5.75, which is comparable but lower than the findings (6.77 TLU) of Dereje and Abeje (2016) in Sululta *woreda* of Oromia region. Agro-ecologically, the per capita TLU of the lowlander's is greater than the highlanders. However, both the highlanders and lowlanders have above the minimum (2.5TLU) threshold and then can cope up with livelihood hardships through selling their livestock resources (Sandford, 2011).

Plate 9.3: Sheep and Camels in Sawena Market

Source: Own Observation, 2017

These livestock are asset by themselves and are means of production for the highlanders in particular and lowlanders in general. In the absence of modern equipment of agricultural production, households use ox for ploughing, donkey and horse/mule for transportation. Thus, they are used as a means production. On the other hand, households obtained benefits directly from livestock products to peruse their livelihoods. In this regard, both the highlanders and lowlanders use milk and its product, eggs, meat and skin and hide to make household income. However, as to which agro-ecological households make better livelihood from these assets, studied revealed that the lowlanders were more beneficiaries as livestock with large economic value, like camel, are entirely reared in the lowlands. Besides, the lowlanders give a due attention for a variety of livestock to be reared and hence, they are more productive as they tend to rear selective varieties of livestock.

Plate 9.4: Milk Transported from Sawena to Ginnir Market

Source: Own Observation, 2017

b. Basic Infrastructure and Services

The other important category of physical asset that enable households to make their living is infrastructure and services associated with it. Among these include road and transport, education and health infrastructure and services are worth noting physical capitals (Morse et al., 2009). Although education and health were discussed as human capital in the preceding sub section, educational and health institutions were presented here as services that contributes for such human capitals.

Table 9.7: Distributions of Educational and Health Institutions by Agro-ecological Region

Availability of Social Services		Agro-ecological Regions		
		Highland	Lowland	Total
		Number	Number	Number
Educational Institutions	Grade 1-8	101	96	197
	Grade 9-10	7	5	12
	Grade 11-12	2	2	4
	Higher Education	1	0	1
	Total	111	103	214
Health Institutions	Heath post	51	47	98
	Health station	11	8	19
	Hospital	1 (referral)	1	2
	Total	63	56	119

Source: Bale Zone Education and Health Offices, 2017.

As shown in Table 9.7, the distributions of educational and health institutions were relatively more concentrated in the highland *woredas* of the zone. Not only in the number of service giving institutions but also the levels of educational and health services were found to be higher in the highland agro-ecological regions.

Moreover, road and transport service as a physical asset were discussed here. In the survey, the sampled household heads were requested to indicate the availability of these basic infrastructures and services; and it is presented below.

Table 9.8: Availability of Infrastructure and Services by Agro-ecological Region

Availability of Infrastructure and Services		Agro-ecological Regions					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Have you access to transportation services?	Yes	13	7.6	2	1.2	15	8.7
	No	116	67.4	41	23.8	157	91.3
	Total	129	75	43	25	172	100.0
Is there road infrastructure?	Yes	40	23.3	33	19.2	73	42.4
	No	89	51.7	10	5.8	99	57.6
	Total	129	75	43	25	172	100.0

Source: Field Survey, 2017.

As shown in Table 9.8, the overwhelming majority (91.3%) of the sampled respondents have complained they have no access to transportation service in their locality. Out of these, 67.4% and 23.85 were highlanders and lowlanders, respectively. In the same way the sampled household heads were requested to indicate the availability of road infrastructure; and 57.6% of them denied its availability. Here also the proportions (51.7%) of complaints are higher in the highlands. In the field observation made during data collection, it was found that transportation service is available from the central part of the zone to the *woreda* capitals. Road connectivity and transportation service problem was observed between the neighboring *woredas* (Gololcha and Sewena) and adjacent rural administrative *kebeles* of the same *woreda* and other *woredas*. In this regard, though the government has been making a great effort, still the problem prevails in the study sites. On the other hand, very few household heads (2) of the lowlands have experienced renting of motor-bike as a means of making living.

Therefore, infrastructure and services as a physical asset improve the livelihoods of households through facilitating the exchange of goods and services between households of the same or different agro-ecology. Moreover, this asset can also contributes for the livelihoods of households through creating job opportunity like working on public transportation vehicles and renting of motor-bikes. Field observations made also confirmed that large numbers of youths were involved in renting motor bike as a source of income in Dello-Menna and Sawena *woreda*.

c. Water wells and ponds

The availability and access to water wells (*ela*) and ponds are important indicators of physical capital both in the highland and lowland agro-ecologies of Bale zone (Flintan et al., 2017). Though these resources are communal in most parts of the study sites there are cases where they can be owned privately in the water deficit lowland agro-ecologies. Ponds are commonly found both in the highland and lowland ecologies. It is a technique of utilizing water collected during rainy season for production and consumption purposes. The practice of making human-made pond involves wearing the pool with plastics in order to minimize percolation during the dry season. In this regard, field observation made during data collection witnessed that several ponds were made in the highland agro-ecology through an effort made by government in pond construction and rehabilitation strategies. Although it survives for short period of time, it can be utilized for livestock drinking and small scale vegetable cultivation. Likewise, wells are deeply

excavated boreholes to get access to the ground water resource. This is commonly practiced in the lowland agro-ecology. The wells can be communal or privately owned and mainly utilized for livestock drinking as it has salty taste. Thus, ponds and wells, which support the productivity of agriculture, are also important physical assets.

Plate 9.5: Privately Owned Ponds in Gololcha *Woreda*

Source: Own Observation, 2017

4. Social Capital

This is the other vital capital constructed and established by the community itself. It includes: membership of formal and informal institutions, relationships and trust between and among themselves as well as interconnectedness on the basis of various affairs.

a. Membership and participation in institutions

Households in the two agro-ecologies participated in both formal and informal institutions that directly or indirectly contribute to their livelihoods. Data collected through in-depth interview revealed that some of the formal institutions in which both the highlanders and lowlanders take part include revolving labor based organizations and health insurance. The informal institutions on the other hand include: [14]*ikub,* [15]*idir and* [16]*mahiber.* The rotational labor based organization was initially established informally by the local households to help each other in farming and

[14] Traditional saving institution
[15] An institution meant for cooperation during burial ceremony
[16] An association meant for spiritual purposes

crop cultivation. Later on the government of Ethiopia makes it formal organization whereby rural households organized for the same purpose. Members in social organization work one after the other in rotation on the farms of each other when demanded. In this practice they share not only their labor but also their farming experiences, new technologies and ways of farming. As this form of social institution is indigenous, the role played by the government was to include its structure and make it formal. As a result, it was fairly functioning both in the highlands and lowlands of the administration zone, but more practical among households of the highland agro-ecology.

The other recently introduced social institution is health insurance. This institution is also initiated by the government of Ethiopia. Farming households can be members of the institution based on their interest when they satisfy the minimum requirements demanded like contributing or saving some amount of money periodically. The purpose is to save in the normal time and use it during ill-health status. Although it was reported by all key informants, there was a coincidence of the practice of health insurance registration and field data collection in Rira RKA. Hence, both the highlanders and lowlanders are joining the system recently.

Moreover, key informants were reported that there are other category of social institutions through which rural households make their living is the informal institutions. It includes the institutions like: *ikub*, *idir*, *mahiber*, *debo* and *gosa* which are well known among most Ethiopian households. *Ikub* is an informal financial social institution established by members of common interest in saving and utilizing money turn by turn. Besides, its economic contribution, *ikub* plays role in strengthening the social ties among the members. It further contributes in sharing of labor during emergencies like crop failure. However, the role of this social institution is very minimal in the current situation of the study area. Relatively, it is better functioning among traders and government employees of the highlands than farming households. *Idir* is the other social institution mainly established by members of common interest to help each other during hard-times when one get lost member of a family or other close relatives of couples. It was established by households of the same RKAs locally. Membership include all interested households in RKA be it rich or poor, farming community or traders and government employees, Christian or Muslim. Within one RKA more than one *idir* can be found based on their proximity. The only criterion for membership is willingness and ability to pay monthly contribution and participation

in a periodic meeting. Besides, it is obligatory to partake in burial ceremony of member of a family and to solace the deceasant turn by turn. Besides, such social contributions, members of *idir* have also the commitment of helping each other during the weeks of grieve and other emergency time, particularly in tilling and harvesting crops. However, in the study area, such social institution is working well among the households of the highlands than the lowlands. Although membership in *idir* does not discriminate religion, the lowlanders, who are dominantly followers of Islam, prefer to handle all the responsibilities of *idir* through *gosa* structure.

Gosa is a social structure whereby household organized by blood ties. Unlike *ikub* and *idir, gosa* members do not deposit money for later use. However, they contribute money both in kind and cash instantly during emergencies like damage and death created by natural or human-made factors. Thus, *gosa* is more important among households of the lowlanders.

Mahiber is a religion based social organization principally practiced by followers of Orthodox Christians. It is principally established for religious purposes like to worship together. Membership is based on common interest in the name of their favored saints and angels. Once the organization was established on such common goal, members will be arranged rotationally for preparation of food and drinks once in a month. Though this organization is originally meant for religious purpose, members can also help each other at difficulties. However, as the followers of the religion, Orthodox Christianity, are very few, the socio-economic role of *mahiber* is insignificant in the study sites, particularly in the lowlands.

Debo is the other loosely structured social organization with no permanent membership. It is labor based organization, mainly established for mutual help in agricultural activities and house construction. In *debo*, there are no well-defined criteria for membership. The only consideration is to be active and hard worker in the community. Most of the time neighboring household of similar age group organize themselves and work on the farm fields and other sectors demanded. One of the most important features of *debo* is the trust among the members. They do not have either payment or written agreement to return back their labor credit. They work on this principle of trustworthiness. Due to the nature of their livelihoods, households in the lowland mainly apply this organization for clearing land and house construction, while the highlanders operate it for various purposes like plowing, harvesting and house construction.

Therefore, these social assets have direct and indirect impact in improving the livelihoods of households both in the highlands and lowlands. However, the engagement of the highlanders in such social institutions is superior. On the other hand, female-headed households also participated in these social organizations as members of the male-headed organizations or establish their own separate similar organizations meant to accomplish duties related to female-based labor.

b. Relationships and trust

The other important social asset in such social institutions is the relationship created and trust developed between members of the organizations. Most of the previously discussed informal social institutions are established on the basis of relationships between and among members. Relationship among these rural households is basically dependent on their physical proximity. As a result they valued neighborhood and then form institutions like *ikub*, *idir*, and *debo* on the basis of neighborhood. The other religion based social institutions like *mahiber* is established on the basis of place of worship and favored angle or saint. In case of *gosa*, even distant members of the social organization do have strong connections. Thus, this interconnectedness further developed the trust between them. That looks why these rural households save and lend money in their *ikub* without any written agreement or in front of eye witness. The same holds true for *debo* and *mahiber*. Members of such organizations are also expected to payback their debit honestly. Of course, *idir* may have some pecuniary punishment for unjustified negligence and absenteeism in the date mourning and solace. Hence, these social assets act as glue in strengthening the social cohesion, so that the households develop the habit of cooperating and helping each other at the time of shock and stress.

5. Financial Capital

The financial capital in the context of rural household include access to saving and credit services, employment opportunities, and trade and remittance benefits.

a. Access to Saving and Credit services

Getting access to saving and credit services is vital in improving the livelihood of rural households. It can help them to save during good harvest season and get credit service during

crop and livestock failure due to catastrophes like epidemic diseases, flood, drought and others. However, in the study sites (at rural administrative *kebele* level) such organizations are non-existent, except the currently initiated agriculture sector insurance. Like urban households who join insurance company for their various assets, rural households also begin to be a member of such companies for their agricultural assets like crops and livestock. Although it was recently started, it is beneficial financial institution for rural households as both the highlanders and lowlanders are vulnerable to various shocks and stress. In this regard, households in the lowland were found more involved as they are more vulnerable to shocks and stresses.

b. Income from Employment, Trade and Remittance

In the study area, both the highland and lowland households earn income from non-agricultural activities like employment, trade and remittance. Income earned from employment can be either from none-farm or farm activities. The none-farm employment involves governmental and non-governmental institutions and private employments. In the survey it was found that 1.8% of the sampled households were government employees (see Table 9.1). Households can also employ in farm related activities on farm fields of other households. The survey result shows that 5.4% of the sampled respondents were labor workers. These are common, particularly during sowing seeds and harvesting crops in the highlands. Periodic coffee harvesting is main source of such employment in the lowlands too. This is because; households which have no adequate family member and could not get such labor in *debo* or cooperative labor organization can hire labor on contractual basis. This is commonly done by relatively better off households and the workforces in most cases were, recently arrived in-migrants. The indigenous households could not participate in such business as they consider it inferior. Hence, income obtained from such financial institutions is common both in the highland and lowlands of the study area.

Moreover, households in the highland and lowland agro-ecology obtained income from trade and remittance. In the survey, it was found that 5.7% of the sampled household heads were engaged in trade as a means of living. Out of which 3.5% are in the highlands and the remaining 2.2% are in the lowland (refer Table 9.1). Households in these agro-ecologies engaged in petty trades. This petty trade is done either in small shops (*kioks*) built in front of their home or along the main road crossing their RKA (Rira). The local traders buy these products of the households of locality in relatively fair price and sale them either in their shops or along the main roads both for

local community and passengers. For instance, Rira RKA is found along the way from Goba to Dello Mena town. Hence, the local traders buy cabbage and honey from the harvesters and sale it to passengers. This business is common both in the highlands and lowlands of the zone. In some instances, this petty trade also involves huge money in buying livestock and cereals from the local market and selling outside the local confinement. In this regard, the highlanders (Buria RKA) dominantly engaged in trading cereals, while the lowlanders (Madera) widely involved in livestock trading. In the two RKA (Chirri and Buria) a weekly based market is available. However, in Buria RKA, the local households engaged in trading business, while in Chirri traders come from the nearby Dello-Menna town. Hence trade is also an important financial activity that enables the highland and lowland households to diversify their source of income. In addition, households get remittance from family members living abroad. In this regard, though family members of both the highlanders and lowlanders participated, its volume is relatively higher among households in the highland. Thus, it is possible to say that the highlanders are more beneficiaries from remittance (Henok et al., 2017).

In general, in the study, it was found that both the highlanders and lowlanders are endowed with various categories of assets differently. Some assets are peculiar to highlands, others are specific to lowlands. And none of them are self-sufficient in possessing these asset categories. This in turn calls for interdependency between them. Therefore, highland-lowland linkage is an ideal strategy to sustain the livelihoods of both communities.

9.2 Vulnerability of the Highlanders and Lowlanders to Shocks and Seasonality

Rural households engaged in varieties of livelihood activities to build their assets so that they can sustain hard times. However, households both in the highlands and lowlands are vulnerable to various sorts of trends, shocks and seasonality. Thus, in this sub section an attempt was made to examine the degree of vulnerability of households in the two agro-ecologies from the point of view of these trends, shocks and seasonality.

a. Trends

Trends that derive rural households to vulnerable situation are various, among them emphasis has been given for demographic and resource trends in this discussion. Demographic trend and natural resource trend shows change in opposite direction. Obviously demographic trends show

increasing, while natural resource trends show decreasing. This in turn makes the livelihoods of households vulnerable. Demographic data obtained from secondary sources were presented below. Since the latest census was made in 2007, all data after 2007 are estimates made by CSA.

Table 9.9: Trends of Human Population Growth by Agro-ecology 2007 to 2017

Demographic Trends (Year)	Agro-ecological regions	
	Highland	Lowland
	Number	Number
2007	173591	155516
2010	189771	169047
2014	214536	188067
2017	233753	202726

Source: CSA Yearly Abstract, 2017.

As can be seen in the demographic data, population size of the highlands and lowlands shows an increasing trend. Census results of 1994 is not included to show trends of population growth in the study area as the *woreda* structure did not match with the current structure of *woredas* in the zone. In general, figures in Table 9.9 shows an increase in population size of the highlanders and lowlanders. This increase in population size of the lowlands is attributed to natural increase and resettlement schemes by the government to relocate people from Hararghe zone to Bale zone, particularly Dello-Menna *woreda*. Such increase in population size inevitably creates pressure on the existing land resource. This further has led to over cultivation by reducing fallow periods. This resulted in decline of soil fertility and then agricultural productivity. On the other hand, increase in human population size lead to land fragmentation and landless rural youths. This in turn reduces productivity of the land and forced youth population to leave their locality and move elsewhere to look for job opportunity. This again resulted in reduction of household's human capital. Furthermore, this reduces the asset base of the households which in turn can increase their vulnerability to shocks.

Likewise the livestock population of the highlanders and lowlanders shows an increasing trend, which in turn creates pressure on the existing grazing fields.

Table 9.10: Trends of Livestock Population by Agro-ecology 2003-2007

Agro-ecology	Year	Livestock Categories							Total
		Cattle	Goats	Sheep	Horses	Mules	Donkeys	Camels	
Lowland	2003	213683	67155	8233	7941	3112	11675	37809	349608
	2004	218,339	78150	10038	7578	7768	16532	42972	381377
	2005	233,699	60880	7688	2368	2491	9317	36715	353158
	2006	255,715	84228	15964	1370	1570	11976	53521	424344
	2007	278699	108076	19767	1395	1677	12967	58230	480811
	TLU	**278699**	**14049.00**	**2569.71**	**1534.5**	**1844.7**	**9076.9**	**72787.5**	**380560.61**
Highland	2003	186169	33005	33069	18618	2987	19122	1927	294897
	2004	209545	33871	35361	18773	2167*	6665*	*	306382
	2005	208313	34524	39799	19001	4106	18003	739	324485
	2006	203297	28527	41174	19735	3357	10957	693	307740
	2007	213154	48082	42876	20028	4033	23188	1851	353212
	TLU	**213154**	**6250.66**	**5573.88**	**22030.8**	**4436.3**	**16231.6**	**2313.75**	**269990.99**

*Gololcha *woreda* data was not included

Source: Agriculture/Pastoral Office of the Respective *Woredas*, 2017.

As can be seen from Table 9.10, the general trend of livestock population size shows an increase both in the highlands and lowlands of the study area. This in turn increases the demand for grazing land. However, the available land resource is fixed, which cannot increase with an increasing demand. So inevitably, it creates pressure on the existing fixed resources that resulted in land degradation, which in turn increases the vulnerability of households. Considering the 2007 census results of household heads and livestock counts, on average the highlanders and lowlanders possess per capita TLU of 9.7TLU and 12.71TLU, respectively.

b. Shocks

The assets of rural households' are also vulnerable to various sorts of shocks like health shocks, natural hazards, economic shocks and conflicts. Each of these shocks threatens the asset bases of households. Thus households with good and diversified asset base can withstand these shocks and others could be risked.

Health shocks that impacted agricultural productivity endangered both highland and lowland households. Diseases responsible for crop failure are common in the highland agro-ecology, while livestock diseases are recurrent in the lowland agro-ecology. For instance in 2005 and 2006, in the lowlands and highlands, respectively, an epidemic disease attacked livestock and; reduced their number remarkably (refer Table 9.10). Moreover, natural hazards like flooding and drought affected the asset base of households and increased their vulnerability to food insecurity and famine. Recurrent drought is common in the lowlands of Bale, while flooding and drought sporadically occurred in the highlands. On the other hand, fluctuation in the market value of livestock at the international market affected the financial asset of households in the lowlands. In addition, recurrent conflict between people of the locality (between Oromos and Somalis) is also a shock that is responsible for the loss of enormous livestock resource in the lowlands. Hence, the combined effects of these shocks made the livelihoods of the lowlanders more vulnerable to the highlanders in Bale zone.

Table 9.11: Trends of Drought by Agro-ecology

Year of Drought Incidence		No of HH affected	
		Highland	Lowland
2002		2715	5745
2003		1840	5878
Total		4555	11623

Source: Respective *Woreda's* Office of Agriculture and Rural Development/Pastoral, 2017.

c. Seasonality

Seasonality is also other nature of shock that upset the asset base of households. As most of the agricultural activities are season based, their products and employment opportunities varies across seasons. This in turn affects their earnings. Of course households in highland and lowland agro-ecology of Bale cultivate twice a year (*ganna*[17] and *hagayya*[18]*)*. However, the probability of drought occurrence (*ganna*, 40% and *hagayya*, 30%) was found to be very high in the zone. One drought occurs every two years. And this makes the zone highly vulnerable to seasonal drought (Negussie, 1999). On the other hand, households whose livelihoods are entirely dependent on

[17] Autumn or *belg* season
[18] Spring or *meher* season

livestock rearing are also affected by the seasonality as availability of pasture is dependent on rainfall. During the good production seasons, market value for the agricultural and livestock products usually reduced. It is also reduced during the dry season as the weight of livestock reduces due to shortage of feeds. Likewise, job opportunities related to agricultural activities were reduced due to seasonality of the activities.

Generally, though the reason and level varies, both the highlanders and lowlanders are vulnerable to trends, shocks and seasonality.

9.3 Coping Strategies of the Highlanders and Lowlanders

As indicated in the preceding discussions, the livelihoods of households in the highland and lowland agro-ecology are endangered by various external factors. The capacity of these households to endure such shocks and stresses depends on the range of their asset base. Thus households with wide range of assets can withstand the threats, while those with narrow bases are vulnerable to trends, shocks and seasonality. In this sub section, discussion has been made on the various coping strategies of the highlanders and lowlanders.

Being aware of these trends, shocks and seasonality both highland and lowland households devise different strategies to sustain their livelihoods. In the survey, an attempt was made to assess the coping mechanisms of the sampled households. Accordingly, strategies to cope up with environment related shocks and food scarcity problems were identified.

a. Coping strategies related to vulnerability of natural capital

Increasing trends in human and livestock population undoubtedly created pressure on the existing natural capitals like farming and grazing lands. In order to cope-up with these stresses households adopted different strategies. Some of the strategies employed by the highlanders and lowlanders were presented below.

Table 9.12: Coping Strategies Related to Vulnerability of Natural Capital by Agro-ecology

Coping Strategies of Environmental Problems		Agro-ecological Regions					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Through expanding boundary to the Highlands	Yes	9	2.2	39	9.7	48	11.9
	No	193	47.9	162	40.2	355	88.1
	Total	202	50.1	201	49.9	403	100.0
Through moving cattle to farm fields of the Highlanders	Yes	5	1.2	10	2.5	15	3.7
	No	197	48.9	191	47.4	388	96.3
	Total	202	50.1	201	49.9	403	100.0
Through moving cattle towards communal lands of lowlanders	Yes	125	31.0	52	12.9	177	43.9
	No	77	19.1	149	37.0	226	56.1
	Total	202	50.1	201	49.9	403	100.0

Source: Field Survey, 2017.

As shown in Table 9.12, some of the coping strategies demanded a sense of cooperation between households of the two agro-ecologies. For instance, when the lowlanders began to engage in farming activities as a means to diversify their income sources, they involved in expanding their territory to the adjacent lowlands (9.7%), as these localities are relatively productive due to the availability of rainfall. In some cases this expansion of territory may be welcomed by the highlanders, but most of the time it leads them into conflict. Likewise, other households which accounts for 2.5% adopted moving of their cattle to the farm fields of the highlanders as a coping strategy. This is usually done in the dry season after the highlanders harvested all their crops from their farm fields. This coping mechanism would be indisputable, if such movement is made after the highlanders have collected their crops from their farm fields. Conversely, the highlanders used to move their cattle to the communal grounds of the lowlanders (31%) during the wet season as all their farm fields would be covered with crops. The remaining limited grazing lands in the highlands would be reserved for draft and lactating animals as well as small cattle like calves. Moreover, due to high pressure on the existing arable land in the highlands, these households also adopted expanding of their farm land to the adjacent lowlands where precipitation is relatively satisfactory.

On the other hand, households both in the highland and lowland adopted different coping strategies to food scarcity related pressures. Some of their coping strategies include

diversification of income sources through various strategies like engaging in non-farm and off-farm activities, selling of assets, looking loan from relatives and aid from government as well as migration (refer Table 9.13).

Table 9.13: Coping Strategies to Food Scarcity Related Pressures by Agro-ecology

Coping Strategies to Food Scarcity		Agro-ecological Region					
		Highland		Lowland		Total	
		Frequency	Percent	Frequency	Percent	Frequency	Percent
Engaging in Non-farm activities	Yes	125	31.0	3	0.7	128	31.8
	No	77	19.1	198	49.1	275	68.2
	Total	202	50.1	201	49.9	403	100.0
Engaging in Off-farm activities	Yes	129	32.0	43	10.7	172	42.7
	No	73	18.1	158	39.2	231	57.3
	Total	202	50.1	201	49.9	403	100.0
Engaged in Asset Selling	Yes	51	12.7	25	6.2	76	18.9
	No	151	37.5	176	43.7	327	81.1
	Total	202	50.1	201	49.9	403	100.0
Engaged in Migration	Yes	85	21.1	102	25.3	187	46.4
	No	117	29.0	99	24.6	216	53.6
	Total	202	50.1	201	49.9	403	100.0
By Looking Loan from relatives	Yes	90	22.3	34	8.4	124	30.8
	No	112	27.8	167	41.4	279	69.2
	Total	202	50.1	201	49.9	403	100.0
By Looking Aid from Government	Yes	67	16.6	167	41.4	234	58.0
	No	135	33.5	34	8.5	169	42.0
	Total	202	50.1	201	49.9	403	100.0

Source: Field Survey, 2017.

a. Non-farm and off-farm activities

One of the common coping strategies adopted by households in the highlands and lowlands is engagement in non-farm and off-farm activities. These coping strategies were adopted by 31.8% and 42.7% of the respondents, respectively. In the survey it was found that the petty trading activities up on which households' livelihoods depends include trading of cereals (9.7%) and livestock (29.3%) in the local market. Such households buy and sell these agricultural products in the same date and market as they do not have any warehouse for such petty business. Both

cereals and livestock trading are dominantly practiced by households in the highlands. This may be attributed to the seasonality of their farming activities as their production entirely depends on rain fall. Moreover, these households engaged in informal activities like producing and selling of cultural drinks (7.7%), collecting and vending of medicinal plants (0.7%), renting of pack animals (0.5%) and motor bikes (0.5%) and grain mill service (0.5%). When we see the agro-ecological distribution of such activities, production and consumption of the traditional drinks was a common business among households in the highlands, while production and selling of traditional medicines was practiced both by the highlanders and lowlanders. It is dominantly practiced by the lowlanders however. Renting of pack animals like horse was a common business among households in the highlands, particularly in Goba *woreda* as it is connected with tourism sector. On the other hand, renting of motor bikes is commonly practiced both by the highlanders and lowlanders, but it is an important business making asset among the lowlanders, as they utilized it for informal trading. Grain mill service is also available both among households in the highland and lowlands, but widely found in the highland agro-ecology. In addition, though their contribution is insignificant, households both in the highland and lowland also engaged in other cottage industries like carpentry (2.5%), pottery (2%), weaving (2%) and blacksmith (0.7%).

On the other hand, households also engaged in labor activities during labor slack seasons. In this regard, the highlanders seasonally migrated to the lowlands to employee in agriculture labor works like harvesting coffee. Conversely, the lowlanders migrated to the adjacent highland urban center to get employment in daily labor businesses basically in the construction sector. Such households are temporary migrants as they returned back to their usual business during the wet season. Hence both highland and lowland households employed in such activities to diversify their income sources as coping strategies before the onset of the problem.

However, once the problem of food scarcity happened, households were forced to adopt other coping strategies like selling of asset, migration to other agro-ecology, looking loan from relatives and aid from government.

b. Selling of asset

In the survey it was found that 18.9% of the sampled respondents coped up with food scarcity related problems through selling of their asset partly or entirely based on the extent of the problem. Participants of FGDs in the Rira and Buria RKAs indicated that households started to sell their asset sequentially from less productive to high productive assets. Households in the highlands began to sell their asset from cereals reserved for later use and seeding. Then they gradually pass to sell of small cattle like goats, sheep, young bull and heifer. Selling of lactating and ploughing animals was taken as the last option of coping strategy as they are the prime production assets for them. Likewise, discussants of FGD in Mandera and Chirri revealed that households in the lowlands cope up with such stresses through selling assets, mainly livestock. However, selling of livestock in exchange for cereals is common among lowland households. But what matter is the size of livestock sold for such purpose.

c. Migration

Migration is also adopted by households as coping strategy when the food security problem prevails for over an extended period. In such cases, some members of the households were forced to migrate to other localities, particularly to the nearby urban centers found particularly on the highlands. These migrants are supposed to help themselves and their family members stayed at home, through engaging in various labor works. Besides, family members were employed in other relatively better off farming households as herdsman and farmer. Results of FGDs made in all *woredas* revealed that such household members in the highlands migrated to the nearby urban centers like Goba, Robe, Ginnir, Jarra and Dello-Menna. Moreover, they migrated to the lowlands of Dello-Menna and Harena-Bulluk *woredas* seasonally (in July and August) to collect coffee and engage in other irrigation based cultivation. In some very rare instances the lowland households also migrated to work in the farm fields of the highlanders during the two harvest seasons (*ganna* and *hagayya*).

d. Loan and Aid

Based on their social networks and kinship ties, rural households in the highlands and lowlands used to get loans from their relatives and networks as a coping strategy. In the survey, it was found that 30.8% of the households looked for loans from their connections. Out of these, 22.3%

of them were highlanders, while the remaining 8.4% were lowlanders. Items of the loan include cereals, livestock and money. Participants of the FGDs revealed that rural households both in the highland and lowland, have a habit of supplying cereals as free gift and loan during food insecurity seasons. This is dependent on their social cohesion. Lowland households who have good social connections with the highlanders can easily get such offerings and loans. Likewise, highlanders with good social linkage with the lowlander can get access to offerings and loans of livestock like milking cows. Such tradition was also identified by Tolossa and Baudouin (2004) in north eastern Ethiopia among cultivators and pastoralist in Borkena wetland. These types of social cooperation were also observed among households of the same agro-ecology. Moreover, these households give loan to each other in monetary terms based on trust, which is a big social capital among rural households in Ethiopia.

On the other hand, about 58% of the sampled household heads in the study area were dependent on government aids. Out of these, 41.4% of them are lowland households. This may be attributed to the high vulnerability of the lowlanders to such food insecurity problems. As a result, throughout the year, most of the lowland households relied on the various aids provided by the government. The aids are in monetary terms and food aids. As told by the key informant, for households identified on specific criteria, money was paid periodically in Sewena *woreda*. Moreover, some households were supplied with food item after they completed the work given them under the program of "food for work" (*migib lesira*). In this regard, the role of some NGOs was commendable. Such continuous aid provision was not observed in the highland *woredas* of the zone, except for an instant emergency purpose. In the survey, households that account for 12% indicated that they take on other coping strategies like sending their children to their relatives found in the highland or lowland for a while, reducing the frequency and portion of their meals.

In general, rural households both in the highlands and lowlands were vulnerable to food scarcity related stresses. However, the lowlanders were more vulnerable to such shocks than the highlanders as their agro-ecology is fragile and their livelihoods are less diversified. As a result, they adopted various coping strategies.

Table 9.14 Income Sources of Households in ETB

Income sources	N	Minimum	Maximum	Mean	SD
Crops	403	0	59,500.00	2638.7	5488.6
Livestock	403	0	52,500.00	6000.1	8289.6
Others	403	0	100,000.00	4239.7	9153.0
Total	403			12,878.5	

Source: Field Survey, 2017

As can be seen from Table 9.14, sampled household heads of the highland and lowland diversify their source of income as a means to cope-up with the stresses, shocks and trends. The mean cash income obtained from sale of crop products and livestock was about 2638 with SD of 5488, and 6000 and 8289, respectively. The other sources of income were comprised of sale of fruits, coffee, charcoal, firewood, honey, chat and sugarcane was about 100,000 ETB.

The result of such coping strategies was examined through analysis of household's outcome determinants. To this end, multiple linear regression models were employed. In the model the outcome of households was approached through the annual income households obtained from their livelihood activities (Bazezew et al., 2013). The determinant variables were related to household characteristics and farm characteristics. The regression result indicated that from the twelve variables entered to the model six of them were found to be significant at alpha 0.05 levels of significances. The coefficient of determination is 0.31, implying that 31.0% of variation in the annual household income of the households was explained by these variables and it suggests that more explanatory variables need to be added to the model. The collinearity diagnosis result also suggested that family size is highly correlated to age and economically active age group members and thus it was removed from the model to keep the assumptions of collinearity. Thus, number of able labor force, total number of livestock in TLU, total cereal production, linkage status of households, agro-ecological region and sex of the household heads are determinants of factors of household's annual income. This implies that these variables influenced the livelihood outcomes. Refer Table 9.14a and c.

Table 9.14 A: Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.556[a]	.310	.278	8511.908

a. Predictors: (Constant), status in the RKA, size of cultivated plot, sex, total TLU, total cereals product in Kg, educational status of the household head, linkage status, agro-ecological region, main economic activities, number of able labor force in the household.

b. Dependent Variable: total amount of income of households

Table 9.14 B: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7210535117.495	10	721053511.750	9.952	.000[b]
	Residual	16084473194.582	222	72452581.958		
	Total	23295008312.077	232			

a. dependent variable: total amount of income obtained from agriculture based livelihoods

b. Predictors: (Constant), status in the RKA, size of cultivated plot, age of the HH head, total livestock in TLU, total cereals product in Kg, educational status of the HH head, settlement agro-ecology of HH, engagement in non/off farm economic activities, household size, number of able labor force in the HH and linkage status of households to the adjoining agro-ecological regions.

Table 9.14 C: Determinants of Livelihood Outcome

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
		B	Std. Error	Beta			Tolerance	VIF
1	(Constant)	-2519.766	3113.402		-.809	.419		
	Number of able labor force	36.805	319.030	.070	-.125	.008	.799	1.251
	Size of cultivated plot	225.037	539.433	.026	.417	.677	.805	1.243
	Educational status	-162.191	1228.828	-.008	-.132	.895	.869	1.151
	Agro-ecological region	-3441.055	1531.575	-.171	-2.247	.026	.539	1.857
	Total cereals product in Kg	.814	.157	.304	5.176	.000	.902	1.109
	Total livestock count in TLU	.279	.081	.219	3.432	.001	.765	1.307
	Engagement in non/off farm economic activities	-865.294	2991.146	-.018	-.289	.773	.773	1.294
	Migration Status of HH	-4839.903	3166.686	-.088	-1.528	.128	.935	1.069
	Age of the HH head	5006.864	2301.023	.140	2.176	.031	.748	1.336
	Status of the Linkage of HH	6781.878	1630.444	.337	4.160	.000	.472	2.116

a. Dependent Variable: total amount of income obtained from agriculture based livelihoods

Source: Field Survey, 2017.

As can be seen from the values of standardized beta coefficients in Table 9.14c, all the significant variables except agro-ecological region have influenced the household's income positively. Households with active age group family members have direct relationships with the household's income. A one unit increase in family members of the active age group increases their annual income by a factor of 0.07. This finding is in concurrent with the findings of Doyo (2017), Desalegn and Moges (2016). Similarly, the amount of crops produced by the households has a direct positive impact on the household's income. In this case a unit increases in crop production of households increased their annual income by a factor of 0.30. Moreover, the beta index for livestock (TLU[19]) was found to be 0.22, which implies that livestock procession of households had strong and positive association with the household's income. This result is in line with the findings of Bazezew et al. (2013) that was 0.33 indicating strong positive relation

[19] Tropical Livestock Unit Equal to 250 Kg live weight. The conversion value varies according to the type of livestock. Ox=1 TLU, cow=1 TLU, sheep or =0.13 TLU, donkey=0.7 TLU, horse or mule=1.1 TLU, camel=1.25 TLU (Fekadu, 2010, cited in Bazezew et al., 2013)

between livestock resource and household's income. Likewise, the presence of linkage between households of the highland and lowland ecology positively influenced the income earned from agriculture based livelihoods. The value of standardized beta coefficient indicated that one unit increase in the status of household's link (from no or weak to strong linkage) to the adjoining agro-ecological region increases their annual income by factor of 0.337. This implied that presence of linkage between highland and lowland households significantly contributed to improve livelihood of both communities. This is in line with the findings of Huber et al. (2015) which indicated that connectivity through social networks improve livelihoods of households. This implies that the livelihood of households who have social linkage with other community member would be more resilient to those not connected. However, the relationship between agro-ecological region and household's income was found inversely related. A shift from highland agro-ecology to lowland agro-ecology reduces the annual income of households by a factor of 0.12. This is also in agreement with findings of Bazezew et al. (2013) that states households in the lowland and midland earn less income as compared to the highlanders. In the study it was found that age of household head significantly and positively influenced the livelihood outcome of households. This implies that with an increasing of household heads' age, the propensity to diversify livelihood outcome of the household would increases. This may be attributed to the probability of getting more children that could engage in various livelihood activities and produce remittance at older age. This result is in agreement with the findings of Sultana and Liu (2017). However, it is against the claims of Seid (2016) that states age of household head significantly and negatively affected livelihood outcome of households due to resistance of new way of making livelihoods.

9.4 Discussion on the Role of Highland-lowland Linkage in Improving Livelihoods

As indicated in the earlier discussions, rural households in the highlands and lowlands interlinked ecologically, economically, socio-culturally and politically. Certainly, these linkages contributed for improving the livelihoods of both communities through two ways. Firstly it contributes for sustainability of households' livelihoods by broadening their asset bases. For instance, the ecological linkage creates an opportunity for utilizing the ecological resources like land, water, pasture and forest commonly. The economic linkage on the other hand, creates an opportunity for exchanging products that are specific to their agro-ecology. This in turn,

contributes for the development of market at local, regional and national level. Besides, the socio-cultural linkages contributed for the development of human capital through education and health services. The political linkage on its part, created forum through which these households discuss and set grounds by which they can mutually benefited from the various assets. Secondly, these linkages contributed for the improvement of livelihoods of both communities by broadening their coping strategies against stress, shocks and seasonality. In this regard, the ecological linkage contributed in coping up ecological vulnerabilities. For instance, the lowlanders moved to the highlanders' agro-ecology during an extended drought season to look for water and pastures. Conversely, the highlanders moved to the lowlanders' agro-ecology during the wet season to look for pasture and *hora* as their farm fields were covered with crops. This practice of transhumance laid a basis for both communities in building considerable resilience to their household livelihoods. On the other hand, the economic linkage contributed in coping up with vulnerabilities related with resource trends and seasonality of prices. Hence, households in the two agro-ecologies adopted seasonal migration as coping strategy to vulnerability to food insecurity. Such households engaged in non-farm and off-farm activities in either highland or lowland agro-ecology. Moreover, the socio-cultural linkage created a basis for other types of linkages to have mutual benefits. Particularly, in devising the various coping strategies, this type of linkage further strengthen the other linkages. It is on the basis of their social networks that the lowlanders stayed in forests of the highlanders for at least two months. In the same way, the highlanders send part of their livestock to the lowlands based on their social connections. Thus, it is possible to conclude that socio-cultural linkages have been a basis for the other types of linkages.

In general, highland-lowland linkage is found to be one of the most important strategies in building sustainable livelihoods among communities of the highlanders and lowlanders. However, for such linkage to be effective some of the hindering factors like lack/inadequacy of infrastructure, casual conflicts, encroachment on migration routes, discriminatory land use policy ought to capture the attention of policy makers.

9.5 Conclusion

In the study area, the livelihoods of highland and lowland communities relied on both farming and livestock rearing. Though the highlanders practiced mixed farming, their livelihood was basically dependent on farming. Hence, crop production was the mainstay livelihood. Livestock were mainly used as a means of production-oxen as drought power, donkeys and horses as means of transportation. Likewise, most of the lowlanders practiced mixed farming. However, keeping livestock had been their mainstay. Pure pastoralism is found only in the extreme lowlands of the zone.

In the study it was found that both the highlanders and lowlanders were vulnerable to some sorts of stresses, seasonality and shocks. The stresses arose from an increase in human and livestock population in the course of time. As crop cultivation and livestock rearing are traditionally practiced, both livelihood strategies were vulnerable to seasonal situations. On the other hand, the shocks are manifested through the incidence of drought, conflict, livestock disease and crop pest. In this regard, the highlanders were vulnerable to crop pest and casual floods, while the lowlanders were more vulnerable to incidence of drought, livestock disease and conflict. Hence, the livelihood of the lowlanders is more vulnerable to shocks and seasonality.

As both communities of the highland and lowland were aware of their vulnerability to these trends, seasonality and shocks, they devised various coping strategies like diversification of sources of income. In this regard, the lowlanders began to engage in crop cultivation, transhumance, and non-farm activities. On the other hand, the highlanders began to cultivate varieties of crops, which they used not producing before. Some of these coping strategies adopted by the highlanders and lowlanders demanded a mutual understanding between them. For instance, the attempt of engaging in crop cultivation and diversifying crop products need additional arable land, which could not be obtained unless expanding territory to the protected areas or communal lands. Such attempts unless properly managed would lead into conflicting relationships. However, if properly managed, their contribution in improving the livelihoods of both communities would be invaluable.

CHAPTER TEN

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter has presented results of the analysis and discussions made to investigate the types, nature, extent and factors of ecological, economic, socio-cultural and political links between highland and lowland communities of Bale zone and consequent impacts on the livelihood of the communities. Thus summary and conclusion drawn regarding the predetermined objectives and implications were presented.

10.1 Summary

In Ethiopia, highland comprises of a high central plateau with an elevation of 1500 meter above sea level. It is densely populated both in human and livestock populations as it is political center the region, relatively more developed and has favorable climate and sedentary way of life. Conversely, the lowlands are sparsely populated in human population, peripheral, less developed and involves in pastoral and agro-pastoral way of life due to its semi-arid and hostile environment. Inhabitants of these agro-ecological regions had been interacting on various matters. The types of recognized interactions include ecological, economic, socio-cultural and political.

In the study it was found that the highlanders and lowlanders were interlinked ecologically through sharing of communal resources like grazing and arable lands, water, forest and forest products. The basis for such interdependency comes from differential in the endowment of these natural resources. In the study area, arable land, forest and water were well distributed in the highlands, while extensive grazing lands were found in the lowlands. Besides, the availability of such ecological resources varies temporally. Although both agro-ecologies were insufficient in grasses during dry season, usually the lowlands were more moisture stressed or water deficit particularly in this season. However, in the dry season, other sources of fodder like crop residues were relatively obtainable in the highlands. Hence, such spatial and temporal variations of the ecological resources created a platform for different ecological linkages between the highlanders and lowlanders.

Economically, the highlanders and lowlanders were linked through exchange of their agricultural products and livestock and labor out-and in-migration. Variations in the agro-ecological resources on the other hand, created multiple production options for them. This enabled the highlanders to produce highland peculiar products like barely, wheat, cabbage, onion and potatoes. Likewise, it enables the lowlanders to produce lowland specific products like coffee, fruits and sugar cane. Besides, though some products are common for both, the amount of production varied agro-ecologically. In this regard, crop cultivation was dominantly practiced in the highlands while livestock rearing was found to be the mainstay of livelihoods for the lowlanders. However, honey, charcoal, poultry were produced in both agro-ecological regions. Hence, as both the highlanders and lowlanders were not self-sufficient in these agro-ecology specific and common products exchange would become inevitable. Thus, market creates an interface for economic linkage between the highlanders and lowlanders of the zone.

Socio-culturally, the highland and lowland communities were linked through sharing of social services and participation in cultural affairs. Social institutions such as education, health and court at higher levels that were supposed to develop fairly across the agro-ecologies rather they were found concentrated in the highlands of the administrative zone. This forced the lowlanders to commute and or travel to the highlands, which in turn increased the interaction between the two. Besides, with respect to some of the demographic variables, communities in the highlands and lowlands of Bale showed some socio-cultural homogeneity. A relative homogeneity in ethnicity, language and religious affiliation could have facilitated and increased their social connections through wedding and friendship. Although such social network by itself had been an important social capital, it also had facilitated socio-economic interactions.

Politically, the highlanders and lowlanders were linked through an administrative structures and formal institutions. However, in the current administrative structure, as the *woredas* are partially autonomous they are supposed to have vertical interactions with the zonal administrative structures. This in turn, could have adversely influenced the horizontal interaction that existed among *woredas* of different agro-ecology. This was manifested through poor development of infrastructures that connects them and could have resulted weak links.

The nature of linkage prevailed both in the highlanders and lowlanders may be inferred from the current direction of links of communities in the two agro-ecological regions to get access to

resources, markets and services. Accordingly, it was found that communities in the highland move to the lowland agro-ecology to look for pasture and mineral water for their livestock during the wet season as their farm lands were covers with crops. Conversely, the lowland communities move with their cattle to the highlands to look for crop residues, water, forest shades and grasses in the dry season. Likewise, the highlanders and lowlanders transported their products from place of production and consumption. And it was found that the flow direction of fruits, coffee, sugar cane, sugar beets, sesame, poultry products, livestock were from lowlands to highlands. Conversely, cereals like barley and wheat, cabbages, onions were transported from the highlands to the markets of lowlands. With demand of better social services communities of the lowlands continuously commuted to the highlands. Thus, the flow direction of ecological resources and agricultural products was found to be two directional, while social services linkage was identified as one directional. Regardless of such exceptions however, highland-lowland linkages in the study area were interdependent based on mutual benefits. Moreover, the magnitude of linkage between them was inferred from the frequency of visit they made to other's agro-ecological region. In this regard it was found that communities in the two agro-ecologies made visit to one another's ecological region ranges from one to four times a year. Nevertheless, as the drives for the visit signified, due to diminishing of ecological resources, insufficiency of agricultural products and gradual development of resentments between various socio-cultural groups, the status of the linkage is not to the level expected in the study area.

However, in the study area, all these linkages were hampered by ecological, economic, socio-cultural and political factors. Ecologically, though both the highlands and lowlands are gifted with resources of varied nature, they are dwindling from time to time due to increasing population pressure and stocking density. As the resource bases supposed to link them deteriorated in both agro-ecologies, unquestionably their linkage is getting weaker. Similarly, an increasing pressure on arable and grazing land had led to decline in the productivity of the two communities. As productivity declines, product exchange and labor migration to other's agro-ecology declines. This in turn weakens the economic linkage between the highlanders and lowlanders. Moreover, socio-cultural factors like ethnic animosity and deterioration in the culture of tolerance and accommodations leads to incidence of conflicts. Conflict driven by different factors of natural resources, socio-economic and political elements resulted in humanitarian, social, economic and environmental consequences in the administrative zone.

Notwithstanding its devastating impacts, both the highland and lowland communities employed the legal and indigenous conflict resolution strategies to curb down the problem. But it plays major role in weakening the socio-cultural and other linkages. Hence, the combined effects of these hindering factors resulted in weak linkage of the highlanders and lowlanders of the administrative zone. Nevertheless, the linkage between the highlanders and lowlanders still plays a significant role in improving the livelihoods of both communities.

In the study it was found that the livelihoods of highland and lowland communities relied on both farming and livestock rearing. Although the highlanders practiced mixed farming, their livelihood is basically dependent on farming. Hence, crop production was their mainstay. Livestock were mainly used as a means of production oxen as drought power, donkeys and horses as means of transportation. Likewise, the lowlanders practiced mixed farming. However, keeping livestock was their principal livelihood.

Moreover, it was found that both the highlanders and lowlanders were vulnerable to some sorts of stresses, seasonality and shocks. Most of the stresses were rose from an increased in human and livestock population in the course of time. As crop cultivation and livestock rearing are traditionally practiced, both livelihood strategies are vulnerable to seasonality. On the other hand, the shocks are manifested through the incidence of drought, conflict, livestock disease and crop pest. In this regard, the highlanders were vulnerable to crop pest and casual floods, while the lowlanders were more vulnerable to incidence of drought, livestock disease and conflict. Hence, the livelihood of the lowlanders was more vulnerable to shocks and seasonality. As both communities of the highland and lowland were aware of their vulnerability to these trends, seasonality and shocks, they devised various coping strategies like diversification of sources of income. In this regard, the lowlanders began to engage in crop cultivation, transhumance, and non-farm activities. On the other hand, the highlanders began to cultivate varieties of crops, which they were not produced before. Some of these coping strategies adopted by the highlanders and lowlanders demanded a mutual understanding between them. For instance, the attempt of engaging in crop cultivation and diversifying crop products need additional arable land, which could not be obtained unless and otherwise encroached to the protected areas or communal lands. Such attempts unless properly managed would lead into conflicting

relationships. However, if properly managed, it helps to improve the livelihoods of both communities.

10.2 Conclusion

In the global economic system no region was found to be self-sufficient. This in turn demands spatio-temporal interaction between regions of surplus and deficit. One of the fundamental rationale for interaction between agro-ecological regions through the flow of ecological resources, agricultural products, capital, information in the form of knowledge, training, culture, livestock and population movement in a form of in-and out-migration, is to complement each other's necessity.

The presence of robust ecological and economic linkages between highlands and lowlands required resource, product and service differentials between communities of the two ecological regions. The highlands were endowed with ecological resources such as water, pasture and forest, while the lowlands were gifted with extensive pasture and forest. The products of the highlanders and lowlanders were also mainly fashioned by such ecological resources. Hence communities in both agro-ecological regions were involved in the production of agro-ecology specific products. As a result, the highlanders cultivate crops like barley and wheat, cabbage and rear livestock mainly cattle, while the lowlanders engaged in livestock rearing mainly cattle and camels. This would have created an ideal platform for highland-lowland linkages in Ethiopia in general and Bale administrative zone in particular. Besides, complementarities for resources and products, socio-cultural patterns of the highland and lowland communities created platform for linkage of communities in the two agro-ecological regions. In this regard, a relative homogeneity in ethnicity, language and religious affiliation of communities in the two agro-ecological regions could have facilitated and increased their social connections through marriage and companionship. Although such social network by itself had been an important social capital, it also had facilitated further socio-economic interactions.

Although there is a significant resource and product differential that laid basis for complementarity of highlanders and lowlanders, infrastructure that facilitate their access to market and surplus product supposed to avail at market were found to be big challenges that weaken linkages between highlanders and lowlanders. On the other hand, periodic conflict rose

by competition over the use of ecological resources and services further weaken the linkage between them.

In spite of such frustrating factors, the linkages between highlander and lowlander were not broken exclusively due to its complementarity significance as livelihood coping strategy. Such interactions were made on the basis of previously established socio-cultural linkages. Thus, households who had linkage would better cope up with those stresses and shocks. Result of multiple linear regressions showed that linkage status has the highest beta coefficient in influencing livelihood of households (0.337) in comparison to the other variables in the model. It implied that one step improvement in the status of household's linkage would increases annual income of households' by 6782 ETB, provided that all other variables kept constant.

In general, as agro-ecology was found to be the principal factor for spatial and temporal variation of resources, products and services; ecological, economic, socio-cultural and political linkages between the two agro-ecologies could have substantially contributed to building resilient livelihoods of both communities, particularly the more vulnerable lowlanders.

10.3 Recommendations

In this sub section recommendations and policy implications were presented.

1. In the study it was found that though the highland and lowland communities were ecologically, economically, socio-culturally and politically interlinked, however, magnitude of linkages between them was found to be weak. The contributing factors for such weak linkages were identified as ecological, economical, socio-cultural and political. Thus, in order to reduce deterrents of the linkages all stakeholders are expected to play positive roles in suppressing the effect of restraints.

- ✓ In order to strengthen their ecological linkage, attention ought to be given by the government at different levels to reduce the obstructing effects of natural resources degradation. Appropriate mechanisms ought to be devised for conservation of the ecological resources. Particularly, an ever increasing demand for arable, which in turn reduces the size of pasture ground, ought to be controlled through introducing intensive farming system in both agro-ecologies. Forest resources that play multiple roles in the highland-lowland linkage ought to be protected from unwise uses in the highland

woredas. In general, regarding all these ecological resources management ought to be properly implemented and close supervision need to be made by the concerned establishments.

- ✓ On the other hand, economic linkage between the highlanders and lowlanders should be strengthened by developing market at the local, regional and national level. To this effect, marker infrastructure, road and transportation services ought to be developed at the local and regional level. In this regard, an effort that has been made by the government through URRAP project ought to be strengthened by connecting adjacent *woredas* and rural administrative *kebeles* of the highlands and lowlands and to urban centers.
- ✓ The socio-cultural linkage ought to be strengthened through the establishment of social and cultural institutions both formally and informally. These institutions ought to be established by the local government and communities in such a way that it strengthens the social cohesion of the community by relaxing ethnic tension.
- ✓ Moreover, the current administrative structure that discourages the horizontal linkages between of *woredas* in the different agro-ecological region should to be reconsidered by the federal and regional governments.

2. Despite the fact that the ecological, economic and socio-cultural and political linkages between the highlanders and lowlanders was found to be weak, its contribution to sustainability of livelihoods of both communities has been very important. In order to enhance the contributions of such linkages for the wellbeing of the two communities, the natural, physical, human, social and financial asset bases ought to be broadened.

- ✓ So as to broaden the natural capital basis, particularly the communal resource like grazing and forest lands, customary and other laws should to be designed through participatory approach to regulate management of the resources. An existing customary laws need to be integrated with the statutory laws. Strategies that enhance the productivity of forest and non-timber forest products such as coffee and honey ought to be devised by stakeholders at all levels. Communal grazing grounds ought to be managed properly, protected from bush invasions and agricultural intrusions. Land tenure policy that bridge the gap in the current tenure arrangements of the highlanders and lowlanders ought to be designed by the regional and federal governments.

- ✓ On the other hand, the physical asset basis ought to be widened through devising appropriate land use planning and managing the human and livestock populations properly. Besides, effort of the local government to rehabilitate ponds ought to be strengthened; deep water wells should be developed with the help of technologies so that they can reserve water for longer period of time to be used in the dry seasons.
- ✓ In order to increase the creativity of communities in the productive sectors, human capital ought to be developed through expanding education and health services in both agro-ecologies. The social institutions that enable to maintain the socio-cultural values, which strengthen cooperation and mutual benefits ought to be established and the pre-existing organization need to be strengthened by the community and supported by the local governments.
- ✓ The currently introduced saving schemes of health insurance and other credit service institutions ought to be accessible to the grass-root.

3. Seasonal conflicts emanated from use natural resources, socio-economic and political factors ought to be deterred by designing project works that promote cooperation between the highlanders and lowlanders. Once the incidence of conflict observed employing the customary strategies of conflict resolution was found to be more effective on some selected issues like socio-cultural and resource use conflicts. Thus strengthening indigenous conflict resolving institutions such as council of elders and clan leaders ought to be promoted by the concerned local government institutions.

4. Although the magnitude varies from region to region and at individual level, both the highlanders and lowlanders are vulnerable to stresses, seasonality and shocks. The stress arose from an increased human and livestock population pressure on land resources in due of time. The increasing number of livestock ought to be kept in equilibrium with the existing pasture resource in both agro-ecologies. To this effect, government departments and other local and social institutions that regulate the activities of the sectors ought to introduce scientific ways of increasing productivity on limited pasture grounds. The awareness of livestock keepers should also be raised so that they focus on quality than quantity of livestock. It is also mandatory to support the customary strategies of herd and range management skills scientifically. Local governments in collaboration with communities should work to reducing deterrents that hinder

the practice of transhumance by clearing migratory routes from farm and human encroachments. In is commendable to design policy that regulate and facilitates seasonal mobility of livestock across the agro-ecologies.

5. Finally, the predetermined aim of the study to assess the types, nature and magnitude of highland-lowland linkage and its consequent impact on the livelihoods of both communities, was addressed through data collected from various sources and analyzed qualitatively and quantitatively. However, in the current study, the magnitude of linkage between the two communities were approached from judgment of the respondents and own developed index due to lack of appropriate data that fit the existing spatial interaction models. Thus other researchers ought to measure the magnitude of such linkage by using quantitative data that fit such advanced spatial interaction models. Furthermore, the findings of this study should be considered as suggestive rather than conclusive. Hence, similar studies that would be made in other part of the world/ country would help to supplement the findings of the study.

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Appendix: I Supportive Letters

Pro. No DA-134/15/373/19

Date 18/02/08

To: College of Agriculture and Environmental Sciences (CAES)

UNISA (South Africa)

Subject: Letter of Confirmation

Madda Walabu University has requested as to co-operate and provide support to Mr. **Getachew Demissie Desta** in his PhD research titled **"Highland-lowland Linkages and Its Impact on the Livelihoods of the Communities in Ethiopia: The case of Bale Zone, Oromia Region".** We have also seen the ethical application submitted to us by the researcher.

Thus, we would like to confirm that we have accepted the ethical application and promise to give the necessary support to Mr. Getachew Demissie Desta for his research under taking in Bale Zone.

With regards,

Muktaar Maamiyyaa Faqoo

CC:

To Department of Geography UNISA (South Africa)

To Mr. Getachew Demissie MWU-Robe

From: Dr Ashley Gunter
Acting Chair: Department of Geography
University of South Africa
P O Box 392
UNISA
0002

18 January 2015

To: Getachew Demissie Desta
Student number: 55762735

Supervisor: Dr Ashley Gunter

Dear student

ACCEPTANCE OF YOUR PROPOSAL FOR DPGGR00

Thank you for your recent submissions of your final proposal and draft ethics application. Attached please find copies of the evaluation of your proposal and ethics application for your information and attention.

Proposal:
Your proposal for the module DPGGR00 has been accepted by the Department of Geography after a process of evaluation. There are two evaluations of your proposal, and I hereby request that you discuss the comments of the evaluators with your supervisor and where possible consider the comments before you commence with the research. Please note you do not have to submit a revised proposal with any corrections, the comments are meant to enrich your work further.

Ethics Application:
Your draft ethics application has been evaluated by our internal panel. Your ethics application must still be submitted to the College Ethics Committee for final approval. Please look at the comments of the evaluators on your ethics application and implement these comments. Please note you may only register for 2016 once you have an ethics approval from the college.
(Please follow the link to see how to make an ethics application - http://www.unisa.ac.za/Default.asp?Cmd=ViewContent&ContentID=27669)

Regards

Ashley Gunter
BSc BSc (hon) PDM MA D.Phil
Acting Chair: Department of Geography
UNISA

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsmile: +27 429 12 429 4150
www.unisa.ac.za

Appendix: II Ethical Clearance

UNISA university of south africa

CAES RESEARCH ETHICS REVIEW COMMITTEE

Date: 17/02/2016

Ref #: **2016/CAES/020**
Name of applicant: **Mr GD Desta**
Student #: **55762735**

Dear Mr Desta,

Decision: Ethics Approval

Proposal: Highland-lowland linkages and its impact on the livelihoods of the communities in Ethiopia: The case of Bale Zone, Oromia Region

Supervisor: Dr Muluneh Woldetsadik Abshare

Qualification: Postgraduate degree

Thank you for the application for research ethics clearance by the CAES Research Ethics Review Committee for the above mentioned research. Final approval is granted for the duration of the project.

Please note point 4 below for further action.

The application was reviewed in compliance with the Unisa Policy on Research Ethics by the CAES Research Ethics Review Committee on 17 February 2016.

The proposed research may now commence with the proviso that:

1) *The researcher/s will ensure that the research project adheres to the values and principles expressed in the UNISA Policy on Research Ethics.*
2) *Any adverse circumstance arising in the undertaking of the research project that is relevant to the ethicality of the study, as well as changes in the methodology, should be communicated in writing to the CAES Research Ethics Review Committee. An amended application could be requested if there are substantial changes from the existing proposal, especially if those changes affect any of the study-related risks for the research participants.*
3) *The researcher will ensure that the research project adheres to any applicable*

University of South Africa
Preller Street, Muckleneuk Ridge, City of Tshwane
PO Box 392 UNISA 0003 South Africa
Telephone: +27 12 429 3111 Facsimile: +27 12 429 4150
www.unisa.ac.za

Appendix: III Turn it in Certificate

turnitin

Digital Receipt

This receipt acknowledges that Turnitin received your paper. Below you will find the receipt information regarding your submission.

The first page of your submissions is displayed below.

Submission author:	Gd Desta
Assignment title:	GGH 2019 Submissions
Submission title:	PhD Geography thesis
File name:	Getachew_Draft_Thesis_11.docx
File size:	4.82M
Page count:	242
Word count:	69,150
Character count:	405,037
Submission date:	07-Jan-2019 09:49AM (UTC+0200)
Submission ID:	1061882275

Highland-lowland Linkages and Its Implications on the Livelihoods of the Communities in Ethiopia: The case of Bale Zone, Oromia Region

By: Getachew Desissa

Submitted in Accordance With the Requirements for Degree of

Doctor of Philosophy in Geography

at the

University of South Africa

Supervisor: Dr Mulunch Weldeslasdik (Associate Professor)

Co-supervisor: Prof. MD Nicolau

Nov. 2018

Appendix: IV Comparison of Mean Age of Sample Households by RKAs

ANOVA

Categorized age into three

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	3.951	3	1.317	4.749	.003
Within Groups	110.659	399	.277		
Total	114.610	402			

Multiple Comparisons

Dependent Variable: Categorized age into three

	(I) In which rural kebele are you living?	(J) In which rural kebele are you living?	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Hochberg	Chirri	Rira	.05361	.07572	.980	-.1466	.2538
		Buria	-.12682	.06040	.199	-.2865	.0329
		Mandera	.25096	.10893	.123	-.0370	.5389
	Rira	Chirri	-.05361	.07572	.980	-.2538	.1466
		Buria	-.18043	.07870	.127	-.3885	.0276
		Mandera	.19735	.12005	.471	-.1200	.5147
	Buria	Chirri	.12682	.06040	.199	-.0329	.2865
		Rira	.18043	.07870	.127	-.0276	.3885
		Mandera	.37778*	.11102	.004	.0843	.6713
	Mandera	Chirri	-.25096	.10893	.123	-.5389	.0370
		Rira	-.19735	.12005	.471	-.5147	.1200
		Buria	-.37778*	.11102	.004	-.6713	-.0843
	Chirri	Rira	.05361	.09022	.992	-.1887	.2959
		Buria	-.12682	.05598	.137	-.2751	.0215
		Mandera	.25096	.10482	.126	-.0415	.5434
	Rira	Chirri	-.05361	.09022	.992	-.2959	.1887

*. The mean difference is significant at the 0.05 level.

Appendix: V Mean Income of Highlanders and Lowlanders (Independent t-test)

Independent Samples Test									
Total household income obtained from agriculture and non-agriculture livelihoods	Levene's Test for Equality of Variances		t-test for Equality of Means						
	F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
								Lower	Upper
Equal variances assumed	1.66	.198	-1.6	306	.102	-3179	1938	-6992	634
Equal variances not assumed			-1.6	288	.100	-3179	1927	-6972	613

Appendix: VI Comparison of Mean Income by Agro-ecology (Independent t-test)

Independent Samples Test											
Incomes obtained from		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Crops Production	Equal variances assumed	11.95	.001	5.65	401	.000	2981.11	526.86	1945	4016
	Equal variances not assumed			5.66	261	.000	2981.11	525.90	1945	4016
Non/off farm	Equal variances assumed	10.14	.002	-4.94	401	.000	-4379.62	886.44	-6122	-2636
	Equal variances not assumed			-4.94	399	.000	-4379.62	886.58	-6122	-2636
Livestock	Equal variances assumed	.094	.759	-1.33	401	.183	-1101.52	825.06	-2723	520
	Equal variances not assumed			-1.33	393	.182	-1101.52	824.78	-2723	520

Appendiv: VII Binary Logistic Regression Models

Table A: Omnibus Tests of Model Coefficients

BLOCK 1: METHOD = STEPWISE (FORWARD LR)

		Chi-square	df	Sig.
Step 1	Step	152.827	1	.000
	Block	152.827	1	.000
	Model	152.827	1	.000

Table B: Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	252.101[a]	.440	.593

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Table C: Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	13.63	6	.034

Table D: Classification Table

Observed			Predicted		
			Status of the Highland-Lowland Linkage		Percentage Correct
			Weak	Strong	
Step 1	Strength of the Highland-Lowland Linkage	Weak	111	24	82.2
		Strong	22	167	88.4
	Overall Percentage				85.8

a. The cut value is .500

Appendix: VIII Survey Questionnaire for the Highlanders

UNIVERSITY OF SOUTH AFRICA

College of Agriculture and Environmental Science

Department of Geography

Dear respondent! The purpose of this questionnaire is to gather information on the nature and extent of the links between highland and lowland communities of Bale zone and consequent impacts on the livelihood of the communities. The success of the study entirely depends on your cooperation. There is no right and wrong answer, so you are kindly requested, to give your genuine responses to the following questions. Your responses will be kept confidential and will only be used for research purposes.

General Instruction:

- ✓ You don't need to write your name
- ✓ You need to circle the coded number in front of your choice from the given options for the close ended questions and write your response on the space provided for open ended questions.

Thanks in advance!

I. Demographic and Socio-economic Information

1. Rural Administrative Kebele (RKA): 1=Rira 2= Buriya

2. Sex: 1=Male 2=Female

3. Age: _____

4. Marital Status: 1=Married 2=Unmarried 3= Separated 4= Widowed

5. Religion: 1= Muslim 2= Orthodox Christian 3= Protestant
4= Indigenous faith 5= Other (Specify) _____

6. To what Ethnic group do you belong? 1= Oromo 2= Amhara 3= Somali
Other (specify)_____

7. Mother Tongue Language: 1= Afan Oromo 2 = Amharic 3= Somali
Other (specify)_____

8. Educational Background: 1=Illiterate 2= Can read and write 3= 1- 4 Grade
4= 5-8 5= 9-12 6= Diploma 7= Degree and above

9. Occupational Status: 1=Farmer 2= Merchant 3= Housemaid 4= Government employee
5= Daily laborer

10. Total family size_____

11. Number of working family members_____

12. Status in the Rural Administrative *Kebele*: 1= Migrant 2= Non-Migrant

13. If you answered "Migrant" to question No. 12: how long have you been here? _____

14. If you answered "Migrant" to question No. 12 where did you live before? _____

II. Questions regarding type, nature and extent of highland-lowland linkages

1. Have you ever visit the neighboring lowland RKA? 1= yes 2= no

2. For question no 1 if your response is yes, how frequent you visit it?

1= daily 2= weekly 3= mor 4=quarterly 5= annually

3. For question no 1, if your response is yes, for what purpose you go there?

Reason for interacting with the neighboring LL RKA. Is it to:	Options	
	yes	no
i. Social Linkages		
Visit relatives and friends?		
Participate in social affairs (wedding, mourning, festivals, negotiation, other)?		
Attend education (primary, secondary and tertiary)?		
Look for health services (health post, health station and hospital)?		
ii. Economic linkages		
Sale/buy agricultural products (cereals, fruits, oilseeds, vegetables)?		
Sale/buy agricultural products (livestock and livestock products)?		
Sale/buy forest products (firewood, charcoal, timber, construction wood and etc)?		
Sale/buy forest products (honey, coffee)?		
Look for job opportunities?		
iii. Ecological Linkages		
Look for pasture land?		
Look for water for livestock?		
Look for forest and forest products?		
Look for arable land?		
iv. Political linkage		

III. Questions on factors influencing the highland-lowland linkages

1. How do you rate the magnitude of your linkage with the lowlanders?
   1= very strong 2= strong 3= no linkage 4= weak 5=very weak
2. For question no 1above, if your response "no linkage" or "weak linkage", why do you think this happen?

Reason for absence/weak linkage between HL and LL regions. Is it b/c of:	Options	
	yes	no
i. Infrastructure and service issues		
Lack of transportation services?		
Lack of road connectivity		
Lack of market? (lack of demand for local products)		
Lack of surplus product? (subsistence production)		
ii. Social/political issues		
Absence of kinship ties (relatives and friends)?		
Language barrier (inability to communicate with local language of the communities?)		
Cultural difference?		
Ethnic hatred?		
Poor administrative structure (only vertical structure)?		
iii. Ecological issues		
Lack of cooperation on the use of communal resources (water, forest, grazing land and etc?)		
Degradation of the existing communal resources		

IV. Questions on nature, extent and causes of conflicts that prevailed and their resolving strategies among highlanders and lowlanders

1. Is there any conflict between you (highlanders and lowlanders): 1= yes 2= no
2. If your response is "yes" for question no 1 above, how often it happens?
   1= frequently 2= seasonally 3= annually

3. What is/are the main cause/s of conflict between you and lowlanders?

Causes of conflict b/n HL and LL communities. Is it because of:	Options	
	yes	no
Communal resource utilization (pasture land, forest, water)		
Land boundaries between highlanders and lowlanders?		
The practice of transhumance?		
Natural resource projects being captured by other groups?		
Breaking protection agreements for grazing and forest areas?		
Unfair distribution of work and profits by government?		
Jealousy related to growing wealth disparities?		
Cultural difference between highlanders and lowlanders?		
Latent family and relatives' revenge act?		
If other specify		

4. What is/are the impact/s of the conflict?

Impacts of conflict b/n you and LL communities. Is it resulted in:	Options	
	yes	no
Human and livestock loss?		
Livestock raiding?		
Deprivation of valuable pasture and water sources?		
Overgrazing and land degradation?		
Spread of livestock disease?		
Collapse of markets and isolation from trade opportunities?		
Food insecurity and dependency on food aid?		
Tension in schools and absenteeism?		
Bush encroachment?		
Displacement from property?		
If other specify		

IV. Questions on the role of the linkages in improving livelihoods of the communities

1. Do you benefited from your interaction with highlanders/lowlanders?

   1= yes 2= no

2. For question no 1 above, if your response is "yes", what benefit did you get?

Benefits obtained from HL and LL interactions. Is it:	Options	
	yes	no
Getting access to grazing land and water?		
Getting access to forest and forest products?		
Getting access to arable land?		
Getting access to health services?		
Getting access to educational institutions?		
Getting access to market		
Getting exposure to others' culture?		
Increase in social relationship?		
Increase of social thrust?		

V. Question on the livelihood coping strategies of highlanders and lowlanders during the time of ecological and economic stress

1. Your livelihoods depends on:

   1= agriculture 2= trade 3= service sector 4= daily laborer

2. If your livelihood depends on agriculture, which one do you practice dominantly?

   1= crop cultivation 2= livestock rearing 3= crop cultivation and livestock rearing

3. If your livelihood depends on crop cultivation, what is the size of your cultivated plot in hectare_____?

4. If your livelihood depends on crop cultivation, what is the size of your potentially cultivable plot in hectare_____?

5. If your livelihood depends on crop cultivation, which crops do you cultivate?

Types of crops cultivated. Is it:	Options	
	yes	no
Cereals (wheat, barley, *teff*, maize, sorghum)		
Oil seeds		
Pulses crops (Peas, Beas)		
Vegetables (Cabbage, pepper, onion)		
If other specify		

6. If your livelihood depends on crop cultivation, how much do you cultivate in Kilogram per year for each crop types?

Types of crops cultivated	Amount of cultivation in Kg/year	Types of crops cultivated	Amount of cultivation in Kg/year
Wheat		Sesame	
Barley		Millet	
Maize		vegetables	
Sorghum		Peas	
Teff		Beas	
Other			

7. If your livelihood depends on crop cultivation, how much do you sale each crop types per year?

Types of crops cultivated	Amount of sale in:		Types of crops cultivated	Amount of sale in:	
	Kg/year	ETB/year		Kg/year	ETB/year
Wheat			Sesame		
Barley			Millet		
Maize			Vegetables		
Sorghum			Peas		
Teff			Beans		
other					

8. If you sale these crop products, who are your dominant customers?
   1= highland communities 2= lowland communities 3= traders
9. If you sale these agricultural products, what other products (livestock and livestock products, forest products) do you buy? And how much?

Types of livestock you purchase. Is it:	Options		How much do you buy per year?
	Yes	no	
Oxen			
Cows			
Camels			
Goats			
Sheep			
Donkeys			
Horses/Mules			
Hens			
If other, specify			

10. If your livelihood depends on livestock rearing, which livestock do you rear? And how much do you have?

Types of livestock reared. Is it:	Options		If yes, how much?
	Yes	no	
Oxen			
Cows			
Camels			
Goats			
Sheep			
Donkeys			
Horses/Mules			
Hens			
Other			

11. If your livelihood depends on livestock rearing, how much net benefit do you get from each of them per year?

Types of livestock reared. Is it:	Net benefit in ETB/year
Ox (fattening or renting)	
Cow (calves, milk and milk products)	
Camel (milk and milk products)	
Goat (fattening, milk and milk products)	
Sheep (fattening and calves)	
Donkey	
Horse/Mule	
Hen (egg, chickens)	

12. If you sale these livestock and their products, who are your dominant customers?

    1= highland communities 2= lowland communities 3= traders

13. If you sale these livestock and their products, what other crop products do you purchase?

Types of crops purchased	Options		If yes, amount of purchase in:	
	yes	no	Kg/year	ETB/year
Wheat				
Barley				
Maize				
Sorghum				
Teff				
Peas				
Beas				
Vegetables				
Other				

14. What other sources of income do you have?

Do you have	Options		If yes, amount of products in:	
	Yes	No	Kg/year	ETB/year
Fruits				
Sugarcane				
Coffee				
Chat				
Honey				
Charcoal				
Fire wood				
Other				

15. Have you ever face environmental problems?

1=yes 2= no

16. If your response for question no 15 above is "yes", what are they?

Ecological problems in the HLs	Options	
	Yes	No
Land fragmentations		
Scarcity of arable land		
Scarcity of grazing land		
Deforestation		
Crops failure		
If other, specify		

17. How do you cope up with these problems?

Copping Strategies	Options	
	Yes	No
Expanding cultivable land to the boundaries of the lowlanders		
Expanding cultivable land by deforestation		
Use of communal grazing lands		
If other, please specify		

18. On question no 16 above, if you respond "yes" on scarcity of grazing land, why it happened?

Reasons for scarcity of grazing land	Options	
	Yes	No
Settlement expansion		
Grazing area cultivated		
Land allocated to new settlers		
Droughts		
Livestock increase		
Irrigation agriculture		
If other, specify		

19. How do you cope up with food scarcity during dry seasons?

Copping Strategies	Options	
	Yes	No
Engage in non-farm activities		
Engage in off-farm activities		
Selling of assets		
Migration		
Looking loan from relatives		
Looking aid from government		
If other, please specify		

20. If you engaged in non-farm activities, in which of the following you engaged and how do you earn from it?

Types of non-farm Activities	Options	
	Yes	No
Trading grains and pulses		
Trading livestock		
Drinks production and sales		

Weaving /spinning		
Carpentry		
Pottery		
Blacksmithing or metal work		
Traditional healers		
Renting out pack animals		
Mills		
Others(specify)		

Appendix: IX Survey Questionnaire for the Lowlanders

UNIVERSITY OF SOUTH AFRICA

College of Agriculture and Environmental Science

Department of Geography

Dear respondent! The purpose of this questionnaire is to gather information on the nature and extent of the links between highland and lowland communities of Bale zone and consequent impacts on the livelihood of the communities. The success of the study entirely depends on your cooperation. There is no right and wrong answer, so you are kindly requested, to give your genuine responses to the following questions. Your responses will be kept confidential and will only be used for research purposes.

General Instruction:

- ✓ You don't need to write your name
- ✓ You need to circle the coded number in front of your choice from the given options for the close ended questions and write your response on the space provided for open ended questions.

Thanks in advance!

I. Demographic and Socio-economic Information

1. Rural Administrative Kebele (RKA): 1=Chirri 2=Manidera

2. Sex: 1=Male 2=Female

3. Age: _____

4. Marital Status: 1=Married 2=Unmarried 3= Separated 4= Widowed

5. Religion: 1= Muslim 2= Orthodox Christian 3= Protestant
4= Indigenous faith 5= Other (Specify) _____

6. To what Ethnic group do you belong? 1= Oromo 2= Amhara 3= Somali
Other (specify)_____

7. Mother Tongue Language: 1= Afan Oromo 2 = Amharic 3= Somali
Other (specify)_____

8. Educational Background: 1=Illiterate 2= Can read and write 3= 1- 4 Grade
4= 5-8 5= 9-12 6= Diploma 7= Degree and above

9. Occupational Status: 1=Farmer 2= Merchant 3= Housemaid 4= Government employee
5= Daily laborer

10. Total family size_____

11. Number of working family members_____

12. Status in the Rural Administrative *Kebele*: 1= Migrant 2= Non-Migrant

13. If you answered "Migrant" to question No. 12: how long have you been here? _____

14. If you answered "Migrant" to question No. 12 where did you live before? _____

II. Questions regarding type, nature and extent of highland-lowland linkages

1. Have you ever visit the neighboring lowland RKA? 1= yes 2= no

2. For question no 1, if your response is yes, how frequent you visit it?
1= daily 2= weekly 3= monthly 4=quarterly 5= annually

3. For question no 1, if your response is yes, for what purpose you go there?

Reason for interacting with the neighboring Highland RKA. Is it to:	Options	
	yes	no
i. Social Linkages		
Visit relatives and friends?		
Participate in social affairs (wedding, mourning, festivals, negotiation, other)?		
Attend education (primary, secondary and tertiary)?		
Look for health services (health post, health station and hospital)?		
ii. Economic linkages		
Sale/buy agricultural products (cereals, fruits, oilseeds, vegetables)?		
Sale/buy agricultural products (livestock and livestock products)?		
Sale/buy forest products (firewood, charcoal, timber, construction wood and etc)?		
Sale/buy forest products (honey)?		
Look for job opportunities?		
iii. Ecological Linkages		
Look for pasture land?		
Look for water for livestock?		
Look for forest and forest products?		
Look for arable land?		
iv. Political linkage		

III. Questions on factors influencing the highland-lowland linkages

3. How do you rate the magnitude of your linkages with the highlanders?
   1= very strong 2= strong 3= no linkage 4= weak 5=very weak
4. For question no 1above, if your response "no linkage" or "weak linkage", why do you think this happen?

Reason for absence/weak linkage between HL and LL regions. Is it b/c of:	Options	
	yes	no
i. Infrastructure and service issues		
Lack of transportation services?		
Lack of road connectivity		
Lack of market? (lack of demand for local products)		
Lack of surplus product? (subsistence production)		
ii. Social/political issues		
Absence of kinship ties (relatives and friends)?		
Language barrier (inability to communicate with local language of the communities?)		
Cultural difference?		
Ethnic hatred?		
Poor administrative structure (only vertical structure)?		
iii. Ecological issues		
Lack of cooperation on the use of communal resources (water, forest, grazing land and etc?)		
Degradation of the existing communal resources		

V. Questions on nature, extent and causes of conflicts that prevailed and their resolving strategies among highlanders and lowlanders

5. Is there any conflict between you and the highlanders? 1= yes 2= no
6. If your response is "yes" for question no 1 above, how often it happens?
   1= frequently 2= seasonally 3= annually

7. What is/are the main cause/s of conflict between you (with the highlanders)?

Causes of conflict b/n HL and LL communities. Is it because of:	Options	
	yes	no
Communal resource utilization (pasture land, forest, water)		
Land boundaries between highlanders and lowlanders?		
The practice of transhumance?		
Natural resource projects being captured by other groups?		
Breaking protection agreements for grazing and forest areas?		
Unfair distribution of work and profits by government?		
Jealousy related to growing wealth disparities?		
Cultural difference between highlanders and lowlanders?		
Latent family and relatives' revenge act?		
If other specify		

8. What is/are the impact/s of the conflict?

Impacts of conflict b/n HL and LL communities. Is it resulted in:	Options	
	yes	no
Human and livestock loss?		
Livestock raiding?		
Deprivation of valuable pasture and water sources?		
Overgrazing and land degradation?		
Spread of livestock disease?		
Collapse of markets and isolation from trade opportunities?		
Food insecurity and dependency on food aid?		
Tension in schools and absenteeism?		
Bush encroachment?		
Displacement from property?		
If other specify		

IV. Questions on the role of the linkages in improving livelihoods of the communities

3. Do you benefited from your interaction with highlanders?

   1= yes 2= no

4. For question no 1 above, if your response is "yes", what benefit did you get?

Benefits obtained from HL and LL interactions. Is it:	Options	
	yes	no
Getting access to grazing land and water?		
Getting access to forest and forest products?		
Getting access to arable land?		
Getting access to health services?		
Getting access to educational institutions?		
Getting access to market		
Getting exposure to others' culture?		
Increase in social relationship?		
Increase of social thrust?		

V. Question on the livelihood coping strategies of highlanders and lowlanders during the time of ecological and economic stress

21. Your livelihoods depends on:

    1= agriculture 2= trade 3= service sector 4= daily laborer

22. If your livelihood depends on agriculture, which one do you practice dominantly?

    1= crop cultivation 2= livestock rearing 3= crop cultivation and livestock rearing

23. If your livelihood depends on crop cultivation, what is the size of your cultivated plot in hectare_____?

24. If your livelihood depends on crop cultivation, what is the size of your potentially cultivable plot in hectare_____?

25. If your livelihood depends on crop cultivation, which crops do you cultivate?

Types of crops cultivated. Is it:	Options	
	yes	no
Cereals (wheat, barley, *teff*, maize, sorghum)		
Oil seeds		
Pulses crops (Peas, Beas)		
Vegetables (Cabbage, pepper, onion)		
If other specify		

26. If your livelihood depends on crop cultivation, how much do you cultivate in Kilogram per year for each crop types?

Types of crops cultivated	Amount of cultivation in Kg/year	Types of crops cultivated	Amount of cultivation in Kg/year
Wheat		Sesame	
Barley		Millet	
Maize		vegetables	
Sorghum		Peans	
Teff		Beans	
Other			

27. If your livelihood depends on crop cultivation, how much do you sale each crop types per year?

Types of crops cultivated	Amount of sale in:		Types of crops cultivated	Amount of sale in:	
	Kg/year	ETB/year		Kg/year	ETB/year
Wheat			Sesame		
Barley			Millet		
Maize			Vegetables		
Sorghum			Peas		
Teff			Beas		
other					

28. If you sale these crop products, who are your dominant customers?

    1= highland communities 2= lowland communities 3= traders

29. If you sale these agricultural products, what other products (livestock and livestock products, forest products) do you buy? And how much?

Types of livestock you purchase. Is it:	Options		How much do you buy per year?
	Yes	no	
Oxen			
Cows			
Camels			
Goats			
Sheep			
Donkeys			
Horses/Mules			
Hens			
If other, specify			

30. If your livelihood depends on livestock rearing, which livestock do you rear? And how much do you have?

Types of livestock reared. Is it:	Options		If yes, how much?
	Yes	no	
Oxen			
Cows			
Camels			
Goats			
Sheep			
Donkeys			
Horses/Mules			
Hens			
Other			

31. If your livelihood depends on livestock rearing, how much net benefit do you get from each of them per year?

Types of livestock reared. Is it:	Net benefit in ETB/year
Ox (fattening or renting)	
Cow (calves, milk and milk products)	
Camel (milk and milk products)	
Goat (fattening, milk and milk products)	
Sheep (fattening and calves)	
Donkey	
Horse/Mule	
Hen (egg, chickens)	

32. If you sale these livestock and their products, who are your dominant customers?

1= highland communities 2= lowland communities 3= traders

33. If you sale these livestock and their products, what other crop products do you purchase?

Types of crops purchased	Options		If yes, amount of purchase in:	
	yes	no	Kg/year	ETB/year
Wheat				
Barley				
Maize				
Sorghum				
Teff				
Peas				
Beas				
Vegetables				
Other				

34. What other sources of income do you have?

Do you have	Options		If yes, amount of products in:	
	Yes	No	Kg/year	ETB/year
Fruits				
Sugarcane				
Coffee				
Chat				
Honey				
Charcoal				
Fire wood				
Other				

35. If you are lowlander, do you ever face environmental problems?

1=yes 2= no

36. If your response for question no 15 above is "yes", what are they?

Ecological problems in the LLs	Options	
	Yes	No
Scarcity of grazing land		
Scarcity of water		
Deforestation		
If other, specify		

37. On question no 16 above, if you respond "yes" on scarcity of grazing land, why it happened?

Reasons for scarcity of grazing land	Options	
	Yes	No
Settlement expansion		
Grazing area cultivated		
Land allocated to new settlers		
Droughts		
Livestock increase		

Irrigation agriculture		
If other, specify		

38. How do you cope up with these problems

Copping Strategies of the lowlanders: Is it through	Options	
	Yes	No
Expanding grazing land to the boundaries of the highlanders		
Moving cattle to the communal pasture and wells of the highlanders'		
Keeping cattle on crop residue of the highlanders' plot		
Moving cattle to their relatives in the highlands		
Purchase of fodders (grass and straw) from highlanders		
If other, please specify		

39. How do you cope up with food scarcity during dry seasons?

Copping Strategies	Options	
	Yes	No
Engage in non-farm activities		
Engage in off-farm activities		
Selling of assets		
Migration		
Looking loan from relatives		
Looking aid from government		
If other, please specify		

40. If you engaged in non-farm activities, in which of the following you engaged and how do you earn from it?

Types of non-farm Activities	Options		Earning per year in ETB
	Yes	No	
Trading grains and pulses			
Trading livestock			
Drinks production and sales			
Weaving /spinning			
Carpentry			
Pottery			
Blacksmithing or metal work			
Traditional healers			
Renting out pack animals			
Mills			
Others(specify)			

Appendix: X Interview Guide for Key Informants in the RKA (Residents)

1. How long do you stay in the RKA?
2. What are the main products of the local communities?
3. Is there any sort of interaction between the highlanders and lowlanders?
4. If there is interaction between them, on what aspects they interact?
5. What are the factors that hinder or facilitate the interaction between them?
6. Do you ever notice conflict between them?
7. If yes what is the cause and its impact?
8. How do they resolve their conflict?
9. Have you ever notice environmental problems like drought and food and fodder scarcity?
10. What do you think the cause is? How people of the locality cope-up with this problem?
11. What should be done to strengthen the linkage between the highlanders and lowlanders?

Appendix: XI Interview Guide for Key Informants (Officials at Different Levels)

1. Is there linkage between the highlanders and lowlanders of the zone/*woreda*?
2. In which ecological regions do infrastructures (road, electricity, telecommunication, water) and services (health, education, transportation) developed well and why?
3. What are the main products of the highlanders and lowlanders of the zone/*woreda*?
4. What are the factors that hinder or facilitate the interaction between them?
5. Is there conflict between them? What is its cause and impact? How frequent it occurs? How is resolved? What has been done and should be done to sustain peace?
6. Which communities usually affected by drought related problems? What do the communities do when there are food shortages?
7. How frequent environment related problems like droughts occur in these localities?
8. What should be done to strengthen the linkage between the highlanders and lowlanders?

Appendix: XII Focus Group Discussion (FGD) Checklist

1. What is the significance of highland-lowland linkage?
2. How do you evaluate the magnitude of highland-lowland linkage?
3. How do you bring your products to market? (when, market information)
4. Why do the highlanders and lowlander conflicted and what should be done?
5. What do you say about the practice of transhumance?
6. What is the dominant livelihood strategies pursued by the people in the area?

Appendix: XIII Observation Checklist

1. What are the main products of the highlanders and lowlanders brought to market for exchange?
2. Availability and adequacy of some infrastructures and services
3. Physical state of the environment like land degradation and the associated factors
4. Size of livestock and crop markets